

# 2019 Symposium

## Individual Abstracts – Morning Session

### **WORKING WITH TURTLE IMMUNE CELLS AND ANTIBODIES IN THE LAB: DETERMINING EXPERIMENTAL CONDITIONS**

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| Presenter  | Abbott, Ceara<br>Undergraduate, Biological Sciences                      |
| Mentor     | Prof. Laura Vogel  |
| Co-Mentor  | Prof. Rachel Bowden  |
| Authorship | Ceara Abbott; Paige Farchmin; Beto Araiza; Rachel Bowden;<br>Laura Vogel |

While much is known about the human immune system, we don't know much about reptilian immune responses. Turtles have long life spans and certainly their immune system contributes to their longevity. Our lab is interested in how turtle immunity works, so we performed experiments to test how turtle white blood cells reacted in common immune assays.

First, we determined if turtle cells could be analyzed and sorted on our new cell-sorting instrument, the FACSMelody. As the instrument has different filters for different size cells, we first determined which filter to use during analysis. Our hypothesis was that the larger turtle cells would appear properly using the 2.0 filter. We analyzed cells run on 1.0, 1.5 and 2.0 filters. We did find that turtle cells were larger in size and need the 2.0 filter.

Next, we needed to determine if turtle cells would survive the cell sorting process on the instrument. We hypothesized the newer and faster sorting technology on the FACSMelody would increase cell survival. We predicted that turtle B cells would be able to survive the sorting. Turtle immune cells were run and sorted into B cell and non-B cell populations. Unfortunately, we found that non-B cells survived, while B cells died during sorting.

Next, we tested two commonly used salt solutions to see if they affected cell viability. BSS is commonly used on human and mouse cells and Ringer's solution is used for amphibians. We hypothesized that reptile cells would survive better in the Ringer's Solution. Turtle immune cells were incubated in each solution and then viability determined. We found that reptile cells did survive better in the Ringer's Solution.

Finally, we tested a method commonly used in purification of human/mouse antibodies from serum samples. Based on previous experiments from our lab, we hypothesized that the Protein G method would not be successful in purifying antibodies from turtle serum, however a recent publication from another lab suggested it may be used. We predicted that the serum proteins from red-eared sliders would not bind to a Protein G column and be washed through. Very little protein was detected after running turtle serum in the assay. Thus, as predicted, the Protein G column was not successful in purifying the antibodies from our turtle species. Overall, our experiments suggest methods commonly used in human/mouse immunology may need to be modified for turtle cells.

# LEGALLY MANDATED CLIENTS AND THEIR EXPERIENCES WITH STIGMA

Presenter: Agnew, Bryn  
Graduate, Social Work

Mentor Prof. Kate Sheridan

This research aims to examine the experience of legally mandated clients in a substance use treatment facility and their history with the staff members. More specifically, this research was aimed to examine and compare clients experience with staff members who have a history of substance use and staff members who do not. Research shows that our society holds a lot stigma toward this cliental group. This stigma can hinder the development of positive relationships between staff and clients, while also hindering client's growth in treatment. These interviews have provided first hand experiences from clients to allow professionals to see the different forms of stigma and how can affect a client.

# SPATIAL PATTERNS OF ALGAL BLOOMS IN LAKE BLOOMINGTON AND EVERGREEN LAKE

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| Presenter  | Ambrose-Igho, Gare<br>Graduate, Geography, Geology, and the Environment |
| Mentor     | Prof. Wondwosen Seyoum  |
| Co-Mentor  | Prof. William Perry   |
| Authorship | Wondwosen Seyoum; William Perry; Catherine O'Reilly                     |

Fresh water is one of the most important sources of drinking water for the United States population and when our water is polluted, it is not only devastating to the environment but also to human health. Algal blooms can cause harmful effects to freshwater ecosystems such as pollution of beaches, taste and odor problems in drinking water, and depletion of oxygen levels causing fish kills. They can have negative effects on the health of humans as well as other animals who use them for drinking or recreation. Algal blooms have been a growing water pollution problem in the Midwest, causing contamination of major reservoirs from which cities and towns draw drinking water. Algal blooms occur in freshwater when there is a sudden rise in the population of algae found in the water body and it causes the color of the water to change. The objective of this research project is to examine the spatial patterns of algal blooms as well as their effect on water quality in Lake Bloomington and Evergreen Lake - the two reservoirs from which the City of Bloomington draws its water for water supply. The Bloomington water-supply system currently supplies over 80,000 people in the city of Bloomington, Hudson & Towanda Townships and half of the population of Dale and Dry Grove townships.

This project explores the effects of algal blooms in water and the environment by using remote sensing and field work data to monitor algal bloom occurrence. Methods that are transferable and will enable the determination of algal bloom occurrence at other locations will be developed. Monitoring of lakes using satellite remote sensing data is useful in estimating and detecting water quality problems that would have gone undetected in lakes. Water samples will be collected from selected locations on the lakes to test for various water properties such as nitrate, phosphate, chlorophyll a, etc. A function derived from regression analysis conducted alongside with models/maps created will be used to predict water quality of the other locations of the lake not sampled. Results have shown that blooms occur at different times of the year in each lake e.g. August for Evergreen Lake, October for Lake Bloomington. Using satellite image reflectance data from Landsat 8 images, we expect to see spatial patterns in water quality.

# WHAT ARE THE TRAINING NEEDS FOR TEACHERS ON RESTORATIVE JUSTICE PRACTICES IN A SCHOOL BASED SETTING?

Presenter

Barnhart, Elizabeth  
Graduate, Social Work

Mentor

Prof. Kathryn Conley Wehrmann

A traditional approach to school discipline has been zero tolerance that centered on suspensions, expulsions, referrals to law enforcement. These approaches focused on establishing guilt, rules outweighing outcomes, and providing no opportunity for the offender to make amends (Smith, Fisher, & Frey, 2015). Zero tolerance policies did not support students and "pushed" them out of the classroom, which ultimately hindered their education quality. Moving away from zero tolerance and implementing restorative justice practices can assist with social-emotional learning and conflict resolution skills, which provide learning opportunities. Restorative justice practices repair harm, reduce risks, and empowers students through peer mediation, peer accountability boards, conferencing, and peace circles. The majority of the research has shown that restorative justice practices have positive impacts in schools, including decreased behavioral referrals/suspensions, repeat offending, disruptive behavior, and disciplinary actions (Mayworm, Sharkey, Hunnicutt, & Schiedel, 2016). Research has shown that teachers found that their classrooms were more relaxed, increased positive relationships with students, students were involved in learning, and showed empathy towards others when restorative justice practices were implemented. The current study will focus on junior high school teachers at an unnamed junior high school in the Midwest. Electronic questionnaires containing open ended questions will be administered to each of the teachers to help identify their knowledge and training needs on restorative justice practices in a school based setting. The information from the questionnaires will be analyzed to determine teacher knowledge and training needs on restorative justice practices in a school based setting. The results of this project will help shape the school's training plan for restorative justice for its teaching staff.

# GENDER DIFFERENCES ASSOCIATED WITH PERSONALITY, ATTITUDES TOWARDS APPEARANCE, AND DISORDERED EATING

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| Presenter | Baumann, Chelsey<br>Undergraduate, Psychology |
| Mentor    | Prof. Suejung Han                             |

This study is a continuation study from "Gender differences in the relationship between personality and distorted eating behaviors", where we found neuroticism and conscientiousness were associated with disordered eating among females, this was consistent among other studies. Neuroticism and conscientiousness were not predictive of distorted eating among men. We found that restricted may be considered a healthy eating behavior.

This study aims to examine gender differences in the relationship between Big Five personality traits (i.e., extraversion, neuroticism, agreeableness, conscientiousness, and openness to experience, McCrae & Costa, 1990), disordered eating behaviors (DEBs, i.e., binge eating, restricted eating, emotional eating). close relationship patterns (ECR-S, i.e., anxiety, avoidance, Wei, Russell, Mallinckrodt, & Vogel, 2007), pressure produced by social norms ( i.e., Sociocultural Attitudes towards Appearance Scale, for men and women), male body dysmorphia (i.e., Muscle Dysmorphia Inventory, MD internalization, risky steroid use, desire for muscle mass, dietary Supplementation, workout priority). Previous literature suggests association between high neuroticism and DEBs is well established among women (e.g. Lzydorczyk, 2012). Research also has shown that conscientiousness is associated positively with restricted eating (e.g., Elfhag & Morey, 2008) and negatively with binge eating among women (e.g., Koren et al., 2014). We found that the literature positively correlates with our findings for women but not for men. We found that there is no correlation between the Big Five personality traits and disordered eating behaviors among men. To examine the distorted eating behaviors among the male demographic the questionnaires need to be geared toward men and not females. We hypothesized that high conscientiousness and low neuroticism among men is an indication of healthy eating behaviors. Also, that the social norms for male body types are held at different standards than women, males are more focused on muscle and women are more focused on being thin. We explored these hypothesis and what personality traits are an indicator for male distorted eating behaviors.

A sample of 300 college students was recruited through the research participation management system for research credits. The study was conducted as an online survey. The survey included Big Five Inventory (John & Srivastava, 1999), Dutch Eating Behaviors Questionnaire (Van Strien, Frijters, Bergers, & Defares, 1986), Experiences in Close Relationships-Short-Form (ECR-S) (Wei, Russell, Mallinckrodt, & Vogel, 2007), Sociocultural Attitudes towards Appearance Scale, Muscle Dysmorphia Inventory and a demographic form. The study findings are meant for clinicians to tailor their interventions for DEBs between men and women.

# EFFECT OF 30% WET BREWER'S GRAIN INCLUSION ON THE GROWTH PERFORMANCE AND CARCASS PERFORMANCE OF FINISHING CATTLE

Presenter

Belon, Danielle  
Graduate, Agriculture

Mentor

Prof. Justin Rickard

Authorship

Danielle Belon; Jennifer Earing; Justin Rickard

The objective of this study was to determine the effect of wet brewer's grain (WBG) inclusion on the growth and carcass performance of finishing cattle. Forty-eight [n=48; 30 steers (414 kg) and 18 heifers (373 kg)] Simmental-Angus beef calves were finished at the Illinois State University Farm. Calves were blocked by weight within sex, randomly assigned to one of two dietary treatments, and fed for 119 or 154 days in a 2 x 2 x 2 factorial arrangement. Dietary treatments included a corn silage-whole shelled corn finishing diet (CON) and CON + 30% WBG for the first half of the finishing period (WB). Diets were mixed daily and feed was offered once daily. Daily feed offered was adjusted based on biweekly bunk scores and feed refusal data collected every 7d. Two-day weights were taken every 28 days, averaged, and used to calculate Average Daily Gain (ADG), Average Daily Feed Disappearance (ADFD), and Gain to Feed (G:F). Cattle were visually appraised for degree of finish by an industry procurement agent, and transported 159km in two groups (119 and 154 days on feed (DOF); average final body weight of 620kg) for processing under USDA-FSIS inspection. Following slaughter, standard USDA carcass data (quality and yield grade) were collected. Statistical analysis was performed utilizing the MIXED procedure of SAS. Feeding WBG improved final live weight ( $P = 0.008$ ), ADG ( $P = 0.039$ ), and G:F ( $P = 0.005$ ) regardless of days on feed. Following WBG inclusion hot carcass weight increased at 154 DOF ( $P = 0.0071$ ). Dressing percentage, ribeye area, 12<sup>th</sup> Rib Fat thickness, marbling score, and yield grade were not significantly impacted by treatment ( $P > 0.05$ ). In this study, early inclusion of WBG supported growth and carcass performance, however additional research examining performance differences based on DOF is warranted.

# BEHAVIORAL CONSEQUENCES OF RNAI-MEDIATED SILENCING OF GAP JUNCTION PROTEINS IN MARBLED CRAYFISH

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| Presenter  | Benson, Abigail<br>Graduate, Biological Sciences |
| Mentor     | Prof. Wolfgang Stein                             |
| Authorship | Andrés Vidal-Gadea; Wolfgang Stein               |

Gap junctions facilitate intercellular communication that underlie swift and coordinated behavioral responses in the nervous system. In invertebrates, innexin proteins are the structural components forming gap junctions providing a direct entryway for electrical signals between adjacent neurons. Although the molecular structures of gap junctions are well-known, their functions and physiological responses vary substantially between different neurons and networks. Recent studies have shown that most animals express multiple subtypes of gap junction proteins. This finding suggests that the molecular composition of gap junctions contributes to the functional diversity of gap junctions, and that individual innexin subtypes have specific effects on electrical communication and neural circuit function.

Here, I use RNA interference (RNAi) to study the contribution of specific innexin subtypes to the well-characterized tail-flip escape behavior in crayfish. Previous studies have shown that tail-flips rely on rectifying gap junctions, suggesting that at least two distinct innexin subtypes are involved in this response. I will test the hypothesis that specific innexins differentially contribute to the tail-flip escape behavior, using RNAi to reduce the expression of individual innexin subtypes. For my experiments, we use the marbled crayfish, *Procambarus virginalis*, and its recently established genome and transcriptome.

My bioinformatics analyses indicate that marbled crayfish share homology for four innexin genes to other invertebrate species. To determine which innexin subtypes may be specific to the tail-flip behavior, I first assessed which of these innexins are expressed in the ventral nerve cord (VNC), which contains the neurons that mediate the tail-flip. To do so, I annotated all crayfish innexin genes allowing the design of innexin-specific primers. My preliminary data suggests that three of the innexin subtypes are expressed in the VNC.

To induce RNAi in the VNC, I created innexin-specific double stranded RNA (dsRNA) for innexin-1. I am currently assessing the contribution of innexin-1 to the tail-flip by systemic dsRNA application to the isolated VNC in a two-fold approach: 1) Real-time quantitative PCR to measure innexin-1 suppression levels over four days. 2) Assessing the effects of innexin-1 suppression on electrical communication in the escape circuit by monitoring the electrical synapse between the lateral giant fiber and the tail motor neurons which mediates the tail flip behavior in crayfish.

# THE INFLUENCE OF SEEDLING HOST QUALITY AND THEIR POTENTIAL DEFENSES AGAINST PARASITISM

Presenter

Berry, Emily

Undergraduate, Biological Sciences

Mentor

Prof. Victoria Borowicz

Authorship

Emily Berry; Anna Scheidel; Victoria Borowicz

*Aureolaria grandiflora* and *Dasistoma macrophylla* are native woodland plants known to parasitize the roots of trees by building modified root-to-root connections known as haustoria. Haustoria penetrate the host's vascular system and siphon out water and minerals from the xylem. *A. grandiflora* and *D. macrophylla* are facultative hemiparasites, which do not require a host if adequate sunlight and nutrients are available. More haustoria form in nutrient-poor soil and growth of hosts is more strongly suppressed by parasitism when nutrient stressed. Although some oaks are known hosts of these hemiparasites, *Quercus macrocarpa* (burr oak) was observed to be a poor host. *Q. macrocarpa* (burr oak) is in the white oak group, which are known for tylose formation. Tyloses are defensive, balloon-like outgrowths that plug up the xylem. White oaks have many tyloses, unlike red oaks which have very few.

In this study, we hypothesize that tylose formation hinders parasitism of the host. If tylose formation inhibits parasitism, we expect white oaks to have fewer haustoria attached to their roots than red oaks. In addition to testing oak type, we will also examine effects of nutrients in the soil using different levels of fertilization. When there are fewer nutrients in the soil, the parasitic plant will use more haustoria to compensate for the loss. We will use a factorial design with 3 factors: hemiparasite (3 levels = no parasite, annual *Dasistoma macrophylla*, perennial *Aureolaria grandiflora*), hosts (5 levels = no host, red oak, shingle oak, white oak, swamp white oak), and fertilizer (2 levels = low vs high). After the growing season has ended, we will count haustoria, and then dry roots and shoots of the hemiparasites and the hosts at 45° C. To test the hypothesis that tylose formation is associated with host quality we will examine whether shoot and root mass of the hemiparasites is greater when grown with hosts in the red oak group than when grown alone or with hosts in the white oak group. We also predict that the impact of host quality for these facultative hemiparasites will increase the number of haustoria on good hosts, such as the red oaks which form fewer tyloses. Our experiment will help us better understand the association between the defense of trees and attack by hemiparasites.



# ETHNICITY AND HOOKUPS: THE EXPERIENCES OF BLACK, WHITE, AND LATINA COLLEGE WOMEN

Presenter

Bosman, Anieka

Undergraduate, Psychology

Mentor

Prof. Corinne Zimmerman

The purpose in this study was to examine the hookup experiences of Black, White, and Latina women. Past research suggests women's hookup experiences may vary by race. For example, Spell (2014) found that White women were more likely to have hookups with strangers, whereas Black women were more likely to hook up with an acquaintance. The participants in the current study were Illinois State University college students who were asked to complete a questionnaire about their most recent hookup experience (e.g., time since last hookup, relationship with hookup partner), a scale assessing hookup reactions (Paul et al., 2000) and a scale assessing hookup outcomes (i.e., academic, social, romantic, and sexual outcomes; Owen et al., 2014). My goal was to further explore hookup reactions and outcomes by examining differences among Black, White, and Latina women. The implications of the findings will be discussed in further detail.

# NITRATE TRANSPORT IN THE UNSATURATED ZONE

Presenter

Bosompemaa, Patience

Graduate, Geography, Geology, and the Environment

Mentor

Prof. Eric Peterson

Abundance of nitrate in the soil is a basic issue in agricultural land-use regions, causing eutrophication and pollution of water bodies. The study focuses on the role of a riparian buffer zone (RBZ) to remove nitrate from the groundwater resulting from agricultural activities. The study area is herbaceous RBZ located in central Illinois (40.614382°N, -89.023542°W), which lies between a stream and a farm located upgradient in Hudson, Illinois. The RBZ has been outfitted with an agricultural runoff treatment system that diverts the tile drainage into the subsurface of the RBZ rather than discharging into the stream. The unsaturated zone of the RBZ allows tile discharge to infiltrate into the unconfined aquifer where it then moves to the stream. The main objective of this research is to understand the role of plants in the transport and fate of nitrate in the unsaturated by addressing two hypotheses 1) during the growing season nitrate removal will be greater in the presence of plants than where plants are absent and 2) during the non-growing season, the nitrate concentration in the pore waters underlying a barren plot (no plants) will be less than in the pores underlying a plot with plants. These hypotheses will help determine whether the plant material in the RBZ is a short-term or permanent sink. Two plots, one without plants (control) and one with plants will be constructed and a statistical comparison of the upgradient and down gradient waters in each plot will be carried out.

# WHAT ARE THE CURRENT SEXUAL ASSAULT CRISIS NEEDS OF MCCLEAN COUNTY RESIDENTS

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| Presenter  | Brown, Jessica        |
|            | Graduate, Social Work |
| Mentor     | Prof. Kate Sheridan   |
| Authorship | Jessica Brown         |

This study is a needs assessment of community members who live in Bloomington IL and the surrounding area. Participants are adults 18 years of age or older. 150 mailing addresses were randomly selected from a greater Bloomington area white pages. Participants were invited to respond to a survey exploring need for services from the YWCA as well as obstacles to accessing needed and existing services. Findings will inform the development of services at the YWCA in the future.

# DO COLLEGE STUDENTS' PERCEPTIONS OF THE POLICE DIFFER BY EDUCATION LEVEL AND MAJOR?

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| Presenter  | Brown, Lashanti<br>Graduate, Criminal Justice Sciences          |
| Mentor     | Prof. Jessie Krienert   |
| Co-Mentors | Prof. Jeffrey Walsh & Prof. Michael Rossler                     |
| Authorship | Lashanti Brown; Jessie Krienert; Michael Rossler; Jeffrey Walsh |

Little is known about the impact that higher education has on students' perceptions of the police, especially with respect to justice education. This study examines perceptions of the police among college students at Illinois State University. It questions how differences in education levels, major, race, age, and gender affect student preconceptions about the police. A 55-question online survey was administered to 451 students at Illinois State University.

Results revealed that those with higher levels of education did not have significantly different contact with police officers than those with less education, however, they were significantly more likely to report positive attitudes towards the police. Significant differences were also noted across both race and gender. No significant differences were noted between criminal justice and non-criminal justice majors when examining contact with and attitudes towards the police.

Qualitative data was also gathered. The data revealed that those with higher education levels displayed a more positive view and outlook of the police. Freshman expressed the most frustration when describing their opinions about the police and their encounters with the police. Criminal justice major participants expressed more favorable views of police than other majors. Future researchers should include a wider representation of respondents by gender, race, and academic level.

**KEY WORDS:** College students' perceptions; Justice Education; Public Perceptions; Police Legitimacy; Procedural Justice; Race

# BENEFITS OF TRAUMA INFORMED SCHOOLS

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| Presenter | Brummitt, Sabin<br>Graduate, Social Work |
| Mentor    | Prof. Kate Sheridan                      |

This study examines teacher's perception of their ability and level of comfort in implementing trauma informed practices in their school or classroom. Participants are also asked to assess changes in their schools ability to be trauma informed. Participants are teachers at Colene Hoose Elementary school in Normal, IL who have participated in a Trauma Informed Schools training. The training consists of 4, 4-day sessions with 1.5 hour sessions (2 in the fall term and 2 in the spring term). Each of the 4 training blocks introduces new concepts regarding trauma informed schools. During the first session of each of the 4, 4-day training blocks, participants are invited to complete a survey (titled Trauma Informed Schools Pre Assessment) indicating one practice that they will implement during the 4-day training session. At the end of the training block, on day 4, participants are invited to respond to a second survey (titled Trauma Informed Schools Post Assessment) regarding their perceptions of their success and challenges in implementing their targeted practice. Also on Day 4 of the first training block (October 4, 2018), teachers completed a survey (TLC Trauma-Informed Schools Evaluation Tool- Questionnaire) regarding their perception of their schools ability to be trauma informed. On the final day of the fourth training block (date to be determined but will occur in the spring term of 2019), teachers are invited to complete the survey (TLC Trauma-Informed Schools Evaluation Tool- Questionnaire) a second time. Findings from the study will inform the development of further training for teachers regarding trauma informed practices with students.

# IMPLICATIONS OF MODERN COGNITIVE SCIENCE ON EPISTEMOLOGY

Presenter

Bukkapatnam, Adityakiran  
Undergraduate, Philosophy

Mentor

Prof. Daniel Breye

Many modern philosophers have tried to bring in the precision of modern science into epistemology. In this project, I will be focusing on the effects that cognitive science has played in affecting epistemological theory. I will further discuss the implications of a specific theory; The Attention Schema theory, on epistemology.

# OPTIMIZATION OF PLASMONIC PAPERS FOR TWO-TIERED DRUG ANALYSIS ON A PORTABLE, SERS-PSI-MS PLATFORM

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| Presenter  | Burr, Daniel<br>Graduate, Chemistry  |
| Mentor     | Prof. Jeremy Driskell  |
| Authorship | Daniel Burr; William Fatigante; John Harms; Jun-Hyun Kim;<br>Christopher Mulligan; Jeremy Driskell |

Evidentiary backlogs in forensics laboratories are replete with suspected illicit substances; streamlining their analysis has the potential to save valuable time and government funding. Part of the delay is owing to the insufficiency of field-test methods, often limited to colorimetric kits that suffer false positives and subjective interpretation. It is our belief that the coupling of a portable Raman and mass spectrometer (MS), both SWGDRUG "Category A" techniques - in addition to the utilization of surface enhanced Raman spectroscopy (SERS) for trace analysis - offers a promising analytical solution to the drawn-out process of screening substances and generating prosecutorial evidence. Paper substrates are an ideal candidate for sample collection: embedded with plasmonic nanoparticles they are capable of SERS detection at nanogram levels, and samples can be sprayed directly into the MS via paper spray ionization (PSI-MS).

The present address highlights recent efforts in the optimization of gold nanoparticle (AuNP) embedded papers. These include SERS limits of detection on papers with different nanoparticle morphologies for 5 representative drugs (2C-B, cocaine, fentanyl, hydrocodone, and JWH-018). While the use of spherical or anisotropic AuNPs allows detection limits in the range of 10 - 100 nanograms for the compounds studied, anisotropic AuNP papers show higher signal enhancement and less complicated background signals. Additionally presented are demonstrations of SERS-PSI-MS from a single sample, using the aforementioned drugs. This has been done sequentially (SERS then PSI-MS), as well as simultaneously (SERS and PSI-MS in tandem) to evaluate spray solvent effects on SERS acquisition and laser effects on PSI-MS. Further investigations highlight not only the compatibility of the two instrumental techniques, but also their complementarity. The structural isomers of APDB, indistinguishable with PSI-MS, are identifiable by SERS via shifts in vibrational bands.

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# GRASTON TECHNIQUE PROTOCOL VS. INSTRUMENT ASSISTED SOFT TISSUE MOBILIZATION FOR DORSIFLEXION CHANGES

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|------------|---|
| Presenter  | Bush, Holly<br>Graduate, Kinesiology & Recreation                                 |
| Mentor     | Prof. Justin Stanek   |
| Authorship | Holly Bush; Stephanie Stephens; Jessica Barrack; Joshua Wooldridge; Justin Stanek |

Context: Limited dorsiflexion (DF) range of motion (ROM) is commonly observed in both the athletic and general population and has been shown to be a predisposing factor for lower extremity injury. A DF deficit can result from tightness of the muscles responsible for plantarflexion of the ankle, specifically the gastrocnemius and soleus. Closed-chain DF measurements of less than 34° alter natural gait patterns and may cause compensation in gait leading to possible injury. Graston Technique (GT) is a form of instrument assisted soft tissue mobilization (IASTM) that has been shown to increase ROM directly after application and is believed to increase local blood flow. GT is unique in that it includes warm-up, IASTM, stretching, and strengthening. Evidence of the long-term effects of GT on ROM and blood flow is lacking, particularly a comparison of the full GT protocol vs. IASTM alone. Therefore, the two objectives are to: 1) Compare ROM changes between the full GT and IASTM alone and 2) Determine long-term local blood flow changes after IASTM application.

Study Design and Setting: Cohort; randomized control trial

Patients or Other Participants: Forty-five participants are being recruited based on one or both limbs having <34° of closed-chain DF. If both limbs qualify, they are then assigned to the same intervention group. In all, 15 participants are allocated into each of the control and two experimental groups.

Interventions: Participants are randomly allocated to one of three groups; GT, IASTM, and control. Participants in the two intervention groups have their closed-chain DF ROM (both standing and kneeling) assessed at baseline, post 2 treatments, post 4 treatments, and 24-48 hours post 6 treatments. Participants in the control group are measured at baseline and three weeks later. Blood flow measurements are taken at baseline and after the 3-week intervention time. The Intervention groups receive 6 treatments in a 3-week time period while the control group receive no treatment. The GT group receive a warm-up, IASTM, stretching, and strengthening of the gastrocnemius and soleus. The IASTM group receive a warm-up and IASTM treatment.

Main Outcome Measures: Closed chain DF is assessed with a digital inclinometer in standing and kneeling. Blood flow measurements are taken using a near-infrared spectroscopy (NIRS), a small device that uses infrared light to measure the amount of blood in the area.



# THE INFLUENCE OF MULTIPLE STRESSORS OF A FUNGICIDE AND MICROSPORIDIAN PARASITE ON BUMBLE BEE HEALTH

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|------------|-------------------------------|
| Presenter  | Calhoun, Austin               |
|            | Graduate, Biological Sciences |
| Mentor     | Prof. Ben Sadd                |
| Authorship | Austin Calhoun; Ben Sadd      |

Pollination services provided by managed and wild bees are essential for agricultural and natural ecosystems. However, threats to pollinator health leading to population declines put these services in jeopardy. Several potential causes of declines have been suggested, including exposure to pathogens and agro-chemicals. Although individual effects are widely studied, interactions between pesticides and immunity may exacerbate the negative effects of individual exposures in environments where they co-occur. In bumble bees (*Bombus* spp.), a landscape analysis demonstrated a correlation between local use of the fungicide chlorothalonil and infection loads of the microsporidian pathogen *Nosema bombi* in declining species. This is suggestive of an interaction, but causation still needs to be established. By exposing microcolonies of *B. impatiens* in a fully reciprocal design to chlorothalonil and/or *Nosema*, we test if a sublethal dose of chlorothalonil influences *N. bombi* infection and exacerbates its negative effects. We predict that chlorothalonil will reduce immune function, leading to increased infection loads and transmission potential, with associated negative effects on health. This study will be the first to experimentally assess the combined stressors of *N. bombi* and chlorothalonil in bumble bees, and will provide information on how bumble bee health will be affected by variability in agro-chemical and pathogen environments.

# LONG-TERM IMPLICATIONS OF EXPUNGEMENT AND SEALING OF CRIMINAL RECORDS ON WELL-BEING

Presenter: Campbell, Jeanna  
Graduate, Social Work

Mentor Prof. Kate Sheridan

This study examines the impact of participating in the "Records Relief Program" at Prairie State Legal Services in McLean and Peoria Counties. The Records Relief Program aids clients in expunging or sealing conviction history so that an individual can seek to make improvements in their life such as furthering their education, gaining access to housing, gaining employment, and gaining employment advancement. Prairie State Legal is currently preparing grant applications for continuation of funding for the Records Relief Program. This study seeks to quantify program outcomes for the purpose of grant applications and also for annual reporting requirements from current funders. Research participants are Records Relief Program participants from January 1, 2017 through the date of IRB approval.

# DECIPHERING THE CONSEQUENCES OF YOLK TESTOSTERONE METABOLISM IN BIRDS: INACTIVATION OR MODIFICATION OF AN ACTIVE SIGNAL?

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|------------|--|
| Presenter  | Campbell, Nicole<br>Graduate, Biological Sciences        |
| Mentor     | Prof. Ryan Paitz   |
| Co-Mentor  | Prof. Rachel Bowden                                      |
| Authorship | Nicole Campbell; Rachel Bowden; Joseph Casto; Ryan Paitz |

Maternal steroids transferred to eggs produce variable phenotypic effects in offspring. One maternal steroid that has garnered interest is testosterone due to its ability to elicit permanent, organizational effects in the brain and other tissues; however, vertebrate embryos actively regulate their maternal steroid exposure through steroid metabolism. We previously showed that in European starling (*Sturnus vulgaris*) eggs, testosterone is metabolized to etiocholanolone early in development which leads us to ask: When does this testosterone metabolism begin? And is etiocholanolone capable of influencing early growth of the developing embryo and extraembryonic membranes? To address the first question, 20 eggs were injected with tritiated testosterone ( $^3\text{H-T}$ ) and incubated for 0, 4, 8, and 12 hours to track the movement of testosterone early in development. To address the second question, 130 eggs were injected with either high (2.0 ng/egg), medium (1.0 ng/egg), or low (0.5 ng/egg) doses of etiocholanolone and sampled on days 3 and 5 of development to quantify the mass of the embryo and extraembryonic membranes. The conversion of testosterone to etiocholanolone was observed after only 4 hours of development. However, etiocholanolone manipulation had no significant effect on the growth rate of the embryos or extraembryonic membranes. This finding suggests that the conversion of yolk testosterone to etiocholanolone may be an inactivation pathway that buffers the embryo from the effects of maternal steroids.

# THE IMPACT OF ADDERALL ON COLLEGE CAMPUSES: ADDICTION OR SCHOOL PERFORMANCE?

Presenter

Capers, Keewon  
Graduate, Criminal Justice Sciences

Mentor

Prof. Ralph Weisheit

Authorship

Claire Advokat; John H. Bishop; Jason A. Ford; Stefanie Stolz;  
Matthew D. Varga

Since the early 2000s, Adderall use on college campuses has been increasing (Drug-Rehabs, 1998). Many college students use adderall non-medically for two hypothesized reasons: academic achievement and addiction (Varga, 2012). However, it is strongly believed that many college students non-medically use adderall for the purpose of academic achievement (Varga, 2012). There has been some research that has also shown that there are several pressures for adderall use and socio-cultural factors that contribute to college students non-medically using adderall, such as the collegiate lifestyle, parental pressure, and real and perceived legal consequences (Varga, 2012; Quintero et al., 2006). In some incidents, college students who want to use adderall oftentimes obtain a prescription from their own personal doctor or a post-secondary institution (Centers for Disease Control and Prevention, 2018). Nonetheless, many post-secondary institutions are still failing to address and regulate the non-medical use of adderall on their campuses (Arria & DuPont, 2010). Thus, the purpose of this study is to examine adderall use on college campuses to determine whether or not students are using adderall because they are either addicted to it or need it to perform well in school. Keywords: Adderall, College Students, College Campuses, Attention-Deficit/Hyperactivity Disorder (ADHD), Parental Pressure, Academic Performance, Addiction, Collegiate Lifestyle, Social Learning Theory, & Strain Theory

# PARENTAL INFLUENCE ON RACIAL/ETHNIC BELIEFS

Presenter

Cassata, Korrie

Undergraduate, Psychology

Mentor

Prof. Suejung Han

Promoting open attitudes toward racial/ethnic diversity is crucial. First, in the increasingly diversified society, racial prejudice will undermine one's ability to work effectively with racially diverse individuals. Second, it is important to prevent racial/ethnically motivated hate crimes by promoting open attitudes, particularly in the current climate with 12% increase in hate crimes in the past two years (Levin, Nolan, & Reitzel, 2017) and 59% of hate crimes being motivated by race/ethnicity (Langton & Masucci, 2004-2015).

One predictor of racial attitudes would be a history of socialization to racial matters through parenting. Research findings are mixed on the role of parenting in racial attitude formation. Some have found strong associations between parental and children's attitudes towards racial/ethnic minorities (e.g., Meeusen & Dhont, 2015), whereas others have found none or weak associations (e.g., Vittrup & Holden, 2010). Moreover, these studies have been mainly conducted among children. It is not clear whether adult children's racial attitudes are influenced by parental racial attitudes that were communicated when they were young. Therefore, this study examines whether there is a significant association between adult children's racial attitudes and their recall of their parents' racial attitudes that were communicated to them in their childhood. Specifically, I hypothesized that recalled parental racial attitudes would predict adult children's racial attitudes.

The study is approved by the university IRB, and the data collection is underway with college students. Participants will complete an online survey of the study. Racial attitudes will be measured by responses to (a) 12 scenarios that describe behaviors of a racial/ethnic minority individual that were created for this study and (b) Color-Blind Racial Attitude Scale (Neville, Lilly, Duran, Lee, & Browne 2000). The participants will also recall parents' racial attitudes that will be measured by 15 items that were developed for this study (e.g., "were your parents open to topics having to do with race?"). The survey also included social desirability scale (Barger, 2002) and a demographic form. Two separate hierarchical regression analyses will be conducted with responses to the scenarios and Color Blindness scores as the two dependent variables, respectively, recalled parental racial attitudes as the independent variable, and social desirability as a covariate to be controlled.

This study findings will inform parents in the public on their crucial roles in promoting open and empathic racial attitudes in their children, which are essential for their cultural competence and for promoting inclusive and safe climate in society.

# SYNTHESIS OF TROPONE-FUSED PORPHYRINS

Presenter

Cramer, Emma  
Undergraduate, Chemistry

Mentor

Prof. Timothy Lash

Porphyrins and related systems have been widely investigated and show promising properties for applications, including as photosensitizers for photodynamic therapy. For applications of this type, the presence of long wavelength absorptions is beneficial. Recently, a carbaporphyrin structure with a fused tropolone unit was shown to have highly modified spectroscopic properties. In order to further investigate this phenomenon, porphyrin and heteroporphyrin structures with fused tropone rings have been targeted for synthesis. Base-catalyzed condensation of diethyl acetonedicarboxylate with 2, 5-dimethylpyrrole-3, 4-dicarbaldehyde gave a tropone-fused pyrrole and subsequent reaction with lead tetraacetate afforded a diacetate derivative. Further condensation with an  $\alpha$ -unsubstituted pyrrole then gave a tripyrrane intermediate. Ongoing studies are being directed towards the preparation of modified porphyrin chromophores from this key intermediate.

# INTERSECTIONALITY THEORY, CHILDREN'S AGENCY, AND REBELLION AGAINST PARENTS: PERSPECTIVES OF RACIAL MINORITIES

Presenter

Creasey, Danielle

Undergraduate, Sociology/Anthropology

Mentor

Prof. Maria Schmeeckle

Children's agency is inhibited not solely by age, but by other areas of privilege and marginalization which work together to shape children's trajectories (Choo & Feree, 2010). Intersectionality theory provides an effective framework to conceptualize these nuances. This study draws upon a larger study of children's agency and childhood rebellion against parents composed of a demographically diverse sample of 61 participants. Participants were adults that either rebelled or wanted to rebel against parents before age eighteen. The sub-sample for this study focuses on 15 native born racial/ethnic minority participants in the United States who categorize their race/ethnicity as African American, Latinx, Asian American, or American Indian. Intersectionality theory is concerned with understanding the ways in which individuals' social advantages and disadvantages are shaped by multiple axes of social division which work together and influence one another (Collins & Bilge, 2016). With this in mind, this study attempts to illustrate how multiple social categories interrelate in participants' stories about childhood rebellion. The participants were asked to connect their rebellions to eight different social categories-race/ethnicity, education, income, age, sex/gender, sexual orientation, religion, and nationality. There are multiple approaches to intersectionality analysis (Misra 2018). Taking an intracategorical approach I have narrowed my sample (diverse across all eight categories) to include only racial/ethnic minorities who were native born in the United States. Taking an intercategory approach I have analyzed participants' rebellion experiences across all eight social categories. Preliminary findings demonstrate that the social categories of education and income contributed to perceptions of rising agency while race inhibited childhood agency during the rebellion period. Although participants were not asked to explicitly relate the social categories to each other, the interrelatedness of these social categories became apparent through their interviews. These and additional findings will be discussed and connected back to the literature on intersectionality and children's agency.

References: Choo, H.Y., & Feree, M.M. (2010). Practicing intersectionality in sociological research: A critical analysis of inclusions, interactions, and institutions in the study of inequalities. *Sociological Theory*, 28: 2: 129-149.

Collins, P.H., & Bilge, S. (2016). *Intersectionality (Key Concepts)*. Cambridge, United Kingdom: Polity.

Misra, J. 2018. Categories, Structures, and Intersectional Theory. In James W. Messerschmidt, Patricia Yancey Martin, Michael A. Messner, and Raewyn Connell (Eds.) *Gender Reckonings: New Social Theory and Research* (pp. 111-130). NY: New York University Press.

# WWI AND THE IMPORTANCE OF DIGITAL HUMANITIES

Presenter

Creighton, Cassidy  
Undergraduate, History

Mentor

Prof. April Anderson-Zorn

WWI touched the lives of everyone in every corner of the world, and that includes the students at Illinois State University in Normal, IL (known as ISNU at the time). During the late war period Angeline Vernon Milner, Illinois State University's first librarian, was assigned to be on the War Services Committee at the university. Her main task was to document students who went overseas to serve. To do so, Milner created and collected surveys, letters, newspaper clippings, etc. from students and families directly affected by the war. Arguably, Milner can be seen as ahead of her time. She knew that this data would be important in the future and took the time to try and preserve the documents.

Digital humanities are important because paper does not last forever. At some point, documents will disintegrate, and digitization can be a great resource to create digital copies of documents. Furthermore, once digitized items can be put onto online databases that can be accessed from remote locations. This opens the door for other researchers and students to use the document even if they do not live close enough to go see it in person. Another advantage is that it prolongs the physical documents life because it does not have to be handled as much.

My research has been to create original metadata for these physical documents. This includes transcribing handwritten materials and researching sources to identify subject terms and related resources. The surveys and letters have revealed interesting events and information experienced by the students and faculty members of ISNU. The digitization of these is important for current faculty and students to look back on to see how the university was impacted during the war.

University history matters--since the centennial of the end of the war happened in November 2018, I think this symposium is the perfect time to showcase the documents to a wider audience. The university has had a history of staying connected with its war veterans since the civil war, and this is an example of that.



# WHAT IMPACT DOES ANIMAL-ASSISTED THERAPY HAVE AN ON THE SOCIAL EMOTIONAL WELL-BEING AND BEHAVIOR OF JUNIOR HIGH STUDENTS?

Presenter

Cushing, Kelsey  
Graduate, Social Work

Mentor

Prof. Kathryn Conley Wehrmann

Animal-assisted therapy in the therapeutic context has been used for approximately 50 years. Initially, animal-assisted interventions were created for the elderly, individuals with disabilities, and children. In recent years, the use of animal-assisted therapy with individuals who have experienced trauma or are diagnosed with PTSD has increased.

The co-PI is currently completing a yearlong MSW internship at a public junior high school located in Central Illinois, which has two certified therapy dogs working with the students. One therapy dog has been working with the students since the beginning of the school year in 2017. The other therapy dog started working with the students at the beginning of this year's school year. Students are able to request to meet with the therapy dog during counseling sessions. The therapy dogs are also present during passing periods in the hallways and can also make visits to classrooms.

The co-PI will observe interactions between students and the therapy dogs, as well as interview students who have worked with the therapy dogs. The co-PI will also interview the school social workers, teachers, and administrators to gather qualitative data about the impact animal-assisted therapy has on behavior, stress response, and overall school climate.

# **DO "WARM HAND-OFFS" IN A PRIMARY CARE SETTING INCREASE PATIENT FOLLOW THROUGH WITH INITIAL BEHAVIORAL HEALTH APPOINTMENTS COMPARED TO THOSE WHERE THERE WAS NO "WARM**

|            |                                       |
|------------|---------------------------------------|
| Presenter  | Davis, Sarah<br>Graduate, Social Work |
| Mentor     | Prof. Kathryn Conley Wehrmann         |
| Authorship | Sarah Davis                           |

The Behavioral Health program, an outpatient counseling service for patients of all ages, is a newer program, piloted in 2014, within the OSF Healthcare community. The Behavioral Health Providers work as part of an individual's primary care team. One way patients receive the Behavioral Health services is through a referral from their medical provider. Providers can make these referrals and connect patients with Behavioral Health Providers (BHPs) during the patient's appointment through a warm hand-off. Warm hand-offs are simply direct transfers of care between two members of the health care team. Warm hand-offs happen in front of the patients, meaning the provider directly introduces the BHP to the patient. This gives the patient a chance to learn about the Behavioral Health services from the BHP, to meet the BHP and ask any questions or express any concerns they may have. There is much debate if warm hand-offs are effective. This study looks at the effectiveness of warm hand-offs in a primary care setting by looking at behavioral health patients who attended their initial appointments and comparing if a warm hand-off was conducted prior to the initial appointment or not. This study will use existing data to determine the rate of follow through with initial behavioral health appointments.

# RARE VOCABULARY USE IN THE NARRATIVES OF AFRICAN AMERICAN CHILDREN

Presenter

Delia, Gianna

Undergraduate, Communication Sciences and Disorders

Mentor

Prof. Jamie Mahurin-Smith

Children who are raised in low-income backgrounds are frequently underrepresented in gifted education and overrepresented in special education (Hamilton 2018). The purpose of this research was to describe a tool for dialect-neutral assessment of language abilities. Specifically, a child's academic success stems from the language skills they have cultivated; however, some standardized language assessments may penalize African American children because their dialect may be Nonmainstream American English (NMAE). The aim of this project was to understand whether the utilization of rare vocabulary increased with age, if it was associated with performance on standardized tests, and if there was a relationship between NMAE and rare vocabulary. Results indicated that rare vocabulary use grows with age and is correlated with standardized test scores but is not associated with dialect use. This project highlighted the importance of the role educators and speech-language pathologists play by observing best practices of evaluating language in school-age African American children using culturally fair strategies to limit overrepresentation in special education classrooms.

# EVALUATION AND EFFECTIVENESS OF A PREVENTATIVE PROPRIOCEPTIVE PROGRAM IN REDUCING LATERAL ANKLE SPRAINS IN D1 COLLEGIATE FOOTBALL PLAYERS

|            |                                    |
|------------|------------------------------------|
| Presenter  | Deplanty, Morgan                   |
|            | Graduate, Kinesiology & Recreation |
| Mentor     | Prof. Justin Stanek                |
| Authorship | Morgan Deplanty; Justin Stanek     |

Context: Ankle sprains are one of the most common injuries seen in collegiate football players. Limited studies are available to evaluate the effects of a preventative proprioceptive program aimed at reducing lateral ankle sprains in Division 1 collegiate football players. Objective: To determine if a 4-week preventative proprioceptive program can reduce the occurrence of ankle sprains in Division I football athletes. Design: Retrospective Non-Randomized Crossover Setting: Athletic Training facility and University Strength and Conditioning Room Patients: Forty-four collegiate male football players. (Mean height = 74.75 inches, mean age = 20.32 years, mean weight = 237.09 lbs, mean # of previous ankle sprains = 1.80) Intervention: Four-week preventative proprioceptive program completed 3-4 times weekly Main Outcome Measurements: BESS Scores, Lateral Ankle Sprains

Methods:

Each volunteer will complete the BESS (Balance Error Scoring System) Test. The researcher will first ask which the volunteer's dominant leg is and will then record any errors the volunteer makes according to the BESS testing standards. The volunteer will first stand with their feet together, eyes closed for thirty seconds. Second, standing on a single leg (dominant leg), eyes closed. Finally, they will stand in a tandem position with their dominant leg in the back position with their eyes closed. These three positions will first be tested on a firm, stable surface and then on a foam, unstable surface. The researcher will record scores for all 6 tests for the volunteers. The volunteers will then begin the four-week proprioception program. Volunteers will complete the assigned exercises of the protocol three times a week before their scheduled weight and conditioning times in either the Redbird Arena Weight Room or the Hancock Stadium football field on the campus of Illinois State University.

The four-week protocol will consist of proprioceptive exercises progressing each week in the four weeks. Exercises include static stances such as single leg stance with arms crossed at chest that progress to more dynamic exercises such as single leg stance with heel taps and single leg stance bend and reach. At the end of the four-week proprioceptive program, the researcher will have each volunteer complete the ESS Test post-program completion. During the fall 2018 football season, the researcher will track and record all ankle sprains that the volunteers may endure. All possible injuries will be evaluated and diagnosed by the team's athletic training staff.

# SONG AND SYLLABLE DIVERSITY IN A CENTRAL ILLINOIS POPULATION OF NORTHERN HOUSE WRENS

|            |   |
|------------|---|
| Presenter  | DiSciullo, Rachael  |
|            | Graduate, Biological Sciences                               |
| Mentor     | Prof. Charles Thompson                                      |
| Co-Mentor  | Prof. Scott Sakaluk   |
| Authorship | Rachael A. DiSciullo; Charles F. Thompson; Scott K. Sakaluk |

Beautiful and abundant, songs of anurans, insects, and birds are well-known acoustic signals shaped by sexual selection. Among these, bird song has long captured the attention of naturalists. Many studies of avian acoustics have examined single facets of male bird song in relation to male-male competition (intrasexual selection) and female mate choice (intersexual selection). However, selection typically acts on multiple components that collectively influence an individual's mating success. One powerful way to account for this is to employ multivariate sexual selection analyses (MSSA) to identify the strength, form, and direction of selection acting on a number of potentially correlated song components. The male Northern house wren (*Troglodytes aedon*) is a small songbird with a complex song structure and large repertoire. How sexual selection has shaped male song in this species is unknown. The first step in determining which components of song are favored by intra- and intersexual selection, through use of MSSA, is to identify and categorize the population-wide song and syllable diversity of males nesting in a natural setting. These defined components, in addition to other song metrics, will be compared to actual reproductive success by use of MSSA. Here we present a "dictionary" of song and syllable types present in a central Illinois population of Northern house wrens to be used in the MSSA.

# EVALUATING SUPPLEMENTAL FOOD PROGRAMS AT CEDAR RIDGE ELEMENTARY SCHOOL

|            |                       |
|------------|-----------------------|
| Presenter  | Dixon, Dina           |
|            | Graduate, Social Work |
| Mentor     | Prof. Kate Sheridan   |
| Authorship | Dina Dixon            |

This research project examined two supplemental food programs offered by cedar ridge elementary school, in Bloomington, Illinois. The programs evaluated were: the Friday food backpack program and the mobile produce distribution program. Students receiving the food backpacks must qualify for free or reduced breakfast and lunch and have been referred to the program by school staff. The mobile produce market is offered in the high-poverty neighborhoods around cedar ridge elementary school, targets students and families that attend cedar ridge, and is open to the public. The purpose of these programs is to address hunger, lack of nutrition, and food insecurity. The purpose of this study was to evaluate the effectiveness of the programs.

# VOLCANIC CORRELATIONS TO CLIMATE CHANGE

|            |   |
|------------|---|
| Presenter  | Dooley, Kaitlyn<br>Undergraduate, Geography, Geology, and the Environment |
| Mentor     | Prof. Tenley Banik  |
| Co-Mentor  | Prof. Catherine O'Reilly  |
| Authorship | Kaitlyn Dooley  |

Title: Volcanic Correlations to Climate Change Author: Kaitlyn Dooley Co-Authors: Dr. Tenley J. Banik, Dr. Catherine O'Reilly  
Volcanic eruptions can impact global climate patterns due to their release of sulfur-containing gases. These gasses include SO<sub>2</sub> and H<sub>2</sub>S, which undergo reactions in the atmosphere to produce H<sub>2</sub>SO<sub>4</sub>-an aerosol that reduces solar flux reaching Earth's surface that resides for years in the stratosphere. Over the last 100 years, geologists and climatologists have observed ice cores and other means of indirect volcanic activity to understand how large volcanic eruptions affect climate. By investigating correlations between sulfur emissions, VEI (Volcanic Explosivity Index), and maximum plume height during eruptions, we try to better understand what eruption parameters could potentially affect regional and global climate. We acquired data via the Smithsonian Institution's Global Volcanism Program (<https://volcano.si.edu>) and other primary literature when necessary to obtain values of sulfur emissions, VEI and plume heights of eruptions, which had a VEI $\geq$ 4 over the last 150 years. Of 85 VEI $\geq$ 4 eruptions, complete data were available for 38. We found no correlation between sulfur emissions and VEI, sulfur emissions and plume height, or plume height with respect to VEI. These findings suggest that sulfur emissions are not dependent on erupted material volume or gas volume. Instead, the metrics investigated here hint at a more complicated interaction of these-and potentially other-factors. The next steps in this project are to correlate these eruption results to climate change over the same period of time in order to determine patterns with any specific volcanic eruptions.

# CHILD THERAPISTS' CLINICAL INSIGHT, SELF EFFICACY AND APPROACHES FOR BEST PRACTICE

|            |                       |
|------------|-----------------------|
| Presenter  | Duran, Lana           |
|            | Graduate, Social Work |
| Mentor     | Prof. Kate Sheridan   |
| Authorship | Lana Duran            |

The purpose of this study was to explore clinical insight for child therapists, specifically factors that enhance or inhibit their self-efficacy in practice. The study was conducted with sexual abuse therapists who work at ABC Counseling and Family Services in all 5 of its' locations throughout central Illinois. The study aimed to determine approaches therapists use, factors that promote their efficacy beliefs and barriers to their sense of effectiveness in their therapeutic approaches.



# EVALUATING EMERGENCY PREPAREDNESS IN THE ILLINOIS LIVESTOCK INDUSTRY

|            |                            |
|------------|----------------------------|
| Presenter  | Dwyer, Rebecca             |
|            | Undergraduate, Agriculture |
| Mentor     | Prof. Michelle Kibler      |
| Authorship | Justin Rickard             |

Emergency preparedness in the livestock industry can include events such as natural disasters, fire, major disease outbreaks, and animal rights activism causing policy changes without industry awareness. This study is imperative to mitigating risk in the livestock industry by educating farmers on various steps to take in the case of an emergency event and providing information regarding how to prepare for such an event. Estimates of potential loss in the cattle industry in cases of foot-and-mouth disease outbreaks ranged between \$43.2 and \$728.5 million in the United States, depending on the scale of the outbreak according to researchers at Kansas State University in 2007. Findings from a 2015 study Colorado State University estimating potential economic impact to a local economy from an equine disease outbreak range between \$500,000 and \$107 million. Few existing studies have investigated the preparedness of livestock producers and equine owners presented with a natural disaster or disease event. Emergency preparedness plans may mitigate the potential economic losses associated with emergency events (e.g. - reduce response time in activating biosecurity procedures). To assess the state of preparedness for an emergency in the Illinois livestock industry, a survey was developed and administered to Illinois Livestock Preparedness Symposium attendees with questions pertaining to the participants' emergency preparedness at their own facilities, their perception of the state of emergency preparedness in the Illinois livestock industry, and information regarding their involvement in the industry. Anticipated results assess the general need for further education in emergency preparedness within the industry, and producer/owner interest in continuing education on the subject. The intent of this research is to establish a baseline for the level of emergency preparedness in the Illinois livestock industry and evaluate the need for further educational events.

# UNDEREMPLOYED AND UNDER-RESOURCED: WHY STRICTER WORK REQUIREMENTS FOR SNAP WON'T WORK FOR ILLINOIS

|            |  |
|------------|--|
| Presenter  | Eastlund, Angela<br>Graduate, Sociology/Anthropology |
| Mentor     | Prof. Liv Stone                                      |
| Authorship | Angela Eastlund                                      |

All work is skilled work. Employment can be a pathway out of poverty, but many people encounter multiple barriers to finding quality, sustainable jobs, such as lack of access to transportation, unstable housing, and food insecurity. Since the passing and implementation of Welfare Reform in the late 1990s and early 2000s, access to social safety net benefits have been restricted through federally mandated work requirements. Access to SNAP (Supplemental Nutrition Assistance Program), formerly known as food stamps, is a critical, and the most successful, anti-hunger program across the nation. SNAP serves a monthly average of 1,914,393 people in Illinois alone. Despite the passing of a bipartisan Farm Bill in 2018, which strengthened SNAP funding and resources, the Trump Administration has proposed federal rule changes that would enact stricter work requirements for individuals seeking food assistance. This policy research project and annotated advocacy toolkit, made in partnership with the Chicago Jobs Council, looks into the effects that such policy changes would enact on the estimated 414,204 Illinoisans that would be at risk of losing food assistance, and how the state of Illinois can prepare for the impending changes.

# CULTURAL COMPETENCE IN CURRENT AND FUTURE SPEECH LANGUAGE PATHOLOGISTS

|            |   |
|------------|---|
| Presenter  | Ebbers, Kristi<br>Undergraduate, Communication Sciences and Disorders |
| Mentor     | Prof. Jean Sawyer   |
| Authorship | Kristi Ebbers; Jean Sawyer  |

This study provided further information about the perceptions of cultural differences in current and future speech language pathologists, and measured the effectiveness of a presentation given about cultural differences and current cultural issues. A self- assessment/survey was distributed to current clinical educators and graduate students prior to the presentation. Information was provided by other students and staff members of the CSD department about different cultures throughout the semester. After the information was given, the same self-assessment was re-distributed and completed by the participants. The responses from the pre- and post-surveys were analyzed and the findings were reported.

Participants were current and future speech language pathologists who provide therapy services through the Ecklemann-Taylor Speech and Hearing Clinic located at Illinois State University. Two groups were surveyed: clinical educators and graduate students. Group A was represented by clinical educators. Group B was represented by graduate students.

The potential participants were reached through email. The participants were given a survey pertaining to their personal opinions on cultural competence and cultural awareness. After all surveys were collected, another group of students and their instructor provided information to participants about a variety of current cultural issues that are seen in Speech Pathology and around the world. After the new information was provided, participants were provided with and re-took the same survey, which was placed in their mailboxes.

The survey results indicated that scores for cultural competence and cultural awareness increased in both groups when the survey was re-distributed.

# **WILL A TRAINING ON CHILDHOOD TRAUMA AND ITS EFFECTS BE USEFUL TO TEACHERS AND 1:1 AIDS**

Presenter

Erving, Latrece  
Graduate, Social Work

Mentor

Prof. Kathryn Conley Wehrmann

About 35 million children in the United States are living with emotional and psychological trauma according to the National Survey of Children's Health (2013). Trauma is defined as a deeply distressing or disturbing experience, because of this; the causes of trauma vary significantly, as well as the signs and symptoms. Teachers are on the frontline when it comes to seeing the impact of trauma and the needs of students. Children enter school with a range of needs, such as educational, health, physical, and social/emotional. This project will use an explanatory mixed method research design. This research aims to discover whether or not an in-service training on trauma will increase teacher's knowledge at a private day school for children with behavioral and learning disabilities. A quantitative pre and posttest will be given to participants to gauge their understanding of the impacts of trauma and how it affect behavior and education. A training satisfaction survey will be administered that will allow for participants to evaluate the training and to add additional comments.

# HIGHLY STABLE GOLD NANOPARTICLES WITHIN A POLYMER PARTICLE TEMPLATE AND THEIR MULTI-CATALYTIC PROPERTIES

Presenter

Eyimegwu, Pascal  
Graduate, Chemistry

Mentor

Prof. Jun-Hyun Kim

Authorship

Wongi Jang; Richard Taylor IV; Hongsik Byun; Jun-Hyun Kim

Composite materials consisting of nanoscale gold particles and protective polymer shells were designed and tested as catalysts in various chemical reactions. Initially, the systematic incorporation of multiple gold nanoparticles into a poly (N-isopropyl acrylamide) particle was achieved by an in situ method under light irradiation. The gold nanoparticle loading, along with the structural and morphological properties, was examined as a function of the amount of initial gold ions and reducing agent. As these gold nanoparticles were physically-embedded within the polymer particle in the absence of strong interfacial interactions between the gold nanoparticles and polymer matrix, the readily-accessible surface of the gold nanoparticles with a highly increased stability allowed for their use as recyclable catalysts in oxidation, reduction, and coupling reactions. Overall, the ability to integrate catalytically-active metal nanoparticles within polymer particles in situ allows for designing novel composite materials for multi- purpose catalytic systems.

# TOWARDS ON-SITE DRUG EVIDENCE CONFIRMATION VIA SURFACE-ENHANCED RAMAN SPECTROSCOPY AND PAPER SPRAY IONIZATION EMPLOYED ON PORTABLE INSTRUMENTATION

|            |  |
|------------|--|
| Presenter  | Fatigante, William<br>Graduate, Chemistry  |
| Mentor     | Prof. Christopher Mulligan   |
| Authorship | William Fatigante; Ashley Stelmack; Daniel Burr; John Harms;<br>Jun-Hyun Kim; Jeremy Driskell; Jamie Wieland; Christopher<br>Mulligan; |

Forensic evidentiary backlogs are indicative of the growing need for cost-effective, high-throughput chemical identification methods, and two emerging technologies that show high promise in meeting this need are Raman spectroscopy and paper spray ionization-mass spectrometry (PSI-MS). While portable instrumentation is available for both of these techniques, enabling rapid screening of evidence in the field setting to assist in investigative decision-making, neither individually fulfills the two-tiered identification guidelines recommended by the Scientific Working Group for the Analysis of Seized Drugs (SWGDRUG) for generating prosecutorial data. Herein, our efforts towards developing portable instrumentation that integrates these two independent, validated techniques will be presented, with the goal of enabling field-based, yet court admissible, evidence identification to circumvent the need for off-site laboratory processing.

Through this work, several intrinsic performance aspects of the combined SERS-PSI-MS experiment are being addressed, such as the capability of a single nanoparticle-modified paper substrate to enable trace detection with both SERS and PSI-MS, whether the analytical performance of this technology can compare to currently established methods for forensic evidence processing, whether court-admissible data can be collected in the field setting, and, importantly, whether this method can be reliably used by non-technical operators.

Extensive efforts have went towards synthesizing and characterizing nanoparticle-modified substrates that exhibit the desired SERS enhancement while minimizing potential deleterious effects on the PSI-MS ionization mechanisms. Nanoparticle candidates have included silver (Ag), gold (Au), Ag-Au core-shell, and novel anisotropic Au nanoparticles applied to diverse paper type. Selection of the optimal paper substrate was guided by maximizing both SERS and PSI-MS intensity, minimizing chemical noise stemming from modification processes, and ensuring ruggedness of the employed substrate towards surface swabbing of trace residues.

Proof-of-principle demonstrations of SERS-PSI-MS using portable instrumentation suggests that this combined technique has the potential to identify illicit chemicals present in both bulk evidence and as trace residues on surfaces of investigatory interest, and representative data will be presented. Also discussed will be our efforts towards comprehensive analytical validation of the technique, including spectral accuracy, reliability (in the form of false positive/false negative rates), sample throughput, and inter- and intra-day-to-day variability. Ruggedness of the combined methodology was also tested amongst users of diverse technical capabilities to demonstrate usage by non-scientists. Of particular interest to this study was demonstrating the discriminatory power of the combined SERS-PSI-MS method towards evidence present as complex mixtures (e.g. cutting agents, adulterants, etc.) and/or exhibiting structural similarities (e.g. novel synthetic analogues).

# IMPLICATIONS OF SOCIAL IDEOLOGIES ON EDUCATION SYSTEMS: COSTA RICA VS THE UNITED STATES OF AMERICA

Presenter

Ferguson, Madeleine

Undergraduate, Teaching and Learning

Mentor

Prof. Miranda Lin

Teaching for the twenty-first century is a political act. To teach in modern classrooms is to be aware and critical of the norms our society holds true. Educators are expected to teach with the democratic ideal in mind; this means being aware of the world in which we live in, and teaching to support a new generation to think critically and thoughtfully with others. A way to become more aware of the world is through travel and experiencing cultures. Through a study abroad opportunity to the beautiful country of Costa Rica, I identified through observation and interactions with locals that this developed Central American country share political commonalities with the U.S. While it is unnatural for the United States to do so, a nation of vast resources and size should look towards other nations to reflect on common practices. This study will examine the immigration policies, religious affiliations, and funding of schools in both Costa Rica and the United states to understand the implications of a society's ideals on their education system. The purpose of this study is to expose the similarities within these two educational systems so that current and future educators can see how these systems are influenced and affect their classrooms.

# YERBA MATE: NATIONAL PROJECT TO EMERGING SUPERFOOD

Presenter Fochesatto, Ana  
Graduate, Sociology/Anthropology

Mentor Prof. Gina Hunter

This paper uses a semiotic analysis and a global commodity chain approach to examine yerba mate as a tool of nation building in South America and an emerging superfood in North America. In particular, I analyze the language and symbols used in the most popular yerba mate brands in Argentina (Taragüi) and the U.S. (Guayakí), and use historical analyses and other secondary data to interpret what these symbols index for consumers in each locale.

Yerba mate, *Ilex paraguariensis*, is a plant commonly found in the Atlantic Forest of South America, a region composed of northeast Argentina, Paraguay, and southern Brazil. Although yerba mate is widely and popularly consumed in these countries, it has only recently been introduced to consumers in the United States. In this new U.S. context, yerba mate has become a "superfood." As extensively studied by Loyer (2016), the health food movement capitalizes on exotic "superfoods" that promise wealthy Western consumers nutritional and medicinal values backed by indigenous wisdom. Like other exotic superfoods, Guayaki's yerba mate marketing promises nutritional and medicinal values validated by a narrative constructed about the indigenous Aché in Paraguay.

This paper continues to analyze the new "superfood" concept that has arisen in Western food discourse by taking a closer look at the case of yerba mate. A transnational analysis of yerba mate product labeling reveals how the construction of yerba mate as a superfood highlights historical processes of nation-building that continue to reinforce oppressive narratives that undermine indigenous rights and identity in both its place of origin and in its new Western market.



# MOTHERS WHO KILL

Presenter

Fondren, Anna  
Graduate, Criminal Justice Sciences

Mentor

Prof. Shelly Clevenger

Women who kill their children seems like an unfathomable thing to do. However, high profile cases such as Andrea Yates and Casey Anthony, shows that this maternal filicide (mothers that kill their children) does happen. This research will examine mothers that killed their children within the last 20 years. Multiple variables will be examined such as: demographics of mother and victim, motivation for maternal filicide, history of diagnosed mental illness and family history of mental illness, history of alcohol and/or substance abuse, history of domestic violence (either perpetrated by mother or someone in the household for from mothers upbringing), other risk factors for maternal filicide (economic marginalization, age of mother, marital status), the specifics of the crime, such as the modus operandi, and the punishment the mother received for the filicide (sentenced and incarceration/ mental institution, probation etc.)

# ELUCIDATING THE FUNCTION OF TON1 RECRUITING MOTIF PROTEINS

|            |  |
|------------|--|
| Presenter  | Fornero, Christy<br>Graduate, Biological Sciences        |
| Mentor     | Prof. Viktor Kirik                                       |
| Authorship | Christy Fornero; Taylor Judd; Jackson Dunn; Viktor Kirik |

Plant cells are fixed in their spatial locations due to the rigid and structural nature of the plant cell wall. In order to produce cells in the positions and at the times in which they are needed, plants must maintain finely tuned control of cell division processes. *Arabidopsis ton1* and *ton2* mutants display random cell division plane placement and lack the plant-specific cortical microtubule array that encircles the nucleus prior to mitosis. In wild type plants, this preprophase band (PPB) of cortical microtubules precisely marks the future division plane at the cell cortex. This is presumably achieved by creating 'molecular memory' via the recruitment of certain proteins to the cortical division site. Though it is known that TON1 and TON2 play important roles in PPB formation, exactly what these proteins are doing and how they are regulated is not known. It is suspected that TON1 Recruiting Motif (TRM) proteins may be involved in TON1 and TON2 recruitment to the PPB. My research focuses on seven members of the TRM superfamily, TRM1, TRM12, TRM13, TRM14, TRM15, TRM18 and TRM33. Yeast-two-hybrid assays indicate that TRMs 1, 12, 13, 14, and 15 interact with TON1. TRM1 has been previously shown to target TON1 to microtubules, and is thus a good candidate for PPB related function. BLAST analysis of the TRMs reveals that TRMs 12, 13, 14, 15, 18, and 33, are all putative phosphatidylinositol n-acetylglucosaminyltransferase subunit Ps (PIGPs). PIGs are involved in the synthesis of glycosyl phosphatidylinositol (GPI) anchors, which are posttranslational modifications that attach the modified proteins in the outer leaflet of the plasma membrane. Here we show experimental results for the targeted disruption of these putative PIGP TRMs, along with localization studies of a larger subset of TRMs, in an effort to shed light on the mechanisms responsible for PPB formation.

# HOW PREPARED ARE TEACHERS AND PARAPROFESSIONALS OF A RURAL SCHOOL DISTRICT TO IMPLEMENT SEL INTO THEIR CLASSROOM INSTRUCTION

Presenter

Fostino, Erik

Graduate, Social Work

Mentor

Prof. Kathryn Conley Wehrmann

This study is aimed at investigating how prepared are the teachers and paraprofessionals of a rural school district to implement Social and Emotional Learning (SEL) into their classroom instruction. Given the importance of SEL, This project seeks to understand teachers' perceptions as they relate to their familiarity with SEL, the short and long-term benefits of SEL, the necessity for SEL, school climate, classroom management, professional development, and confidence in their own abilities to provide SEL instruction. The compiled data from this study will describe the preparedness of staff and provide district administration opportunities to bridge gaps to improve SEL integration throughout the district. This study will employ mixed-methodology.

# **EXAMINING THE IMPACT OF THE ADVERSE CHILDHOOD EXPERIENCES (ACES) MASTER TRAINING FOR SEXUAL ASSAULT CRISIS WORKERS**

|            |   |
|------------|---|
| Presenter  | Frantzen, Alexis<br>Graduate, Social Work |
| Mentor     | Prof. Kate Sheridan                       |
| Authorship | Alexis Frantzen                           |

Sexual assault crisis workers work with individuals who are in very vulnerable stages in their lives. The goal of this research was to evaluate change in knowledge and skills among participants of the Adverse Childhood Experiences (ACES) Master Training. Participants were adults aged 18 years of age or older who were employed at Stepping Stones at YWCA in McLean County who participated in a training to learn about adverse childhood experiences as well as how to administer the ACES instrument with clients at the YWCA.

# CHARACTERIZATION OF SEROTONIN RECEPTOR EXPRESSION IN THE MARBLED CRAYFISH STOMATOGASTRIC GANGLION

|            |   |
|------------|---|
| Presenter  | Gährs, Casey<br>Graduate, Biological Sciences   |
| Mentor     | Prof. Andrés Vidal-Gadea                        |
| Co-Mentor  | Prof. Wolfgang Stein                            |
| Authorship | Casey Gährs; Wolfgang Stein; Andrés Vidal-Gadea |

Serotonin (5-HT) is involved in regulating many behaviors and systemic physiological functions in both vertebrates and invertebrates. The diversity in serotonin's function is mediated through its binding to distinct 5-HT receptors (5-HTRs). For example, a diverse set of 5-HTRs determines the modulatory responses to 5-HT in the pyloric circuit of the stomatogastric ganglion (STG) in decapod crustaceans. Here, 5-HT functions as a neuromodulator, binding to distinct 5-HTRs to evoke different modulatory responses including tonic inhibition, excitation, and rhythmic bursting. While the cellular and circuit effects of 5-HT in the STG are well-characterized, the temporal and spatial patterns of 5-HTR expression and their influence on the neuromodulatory responses to 5-HT are largely unknown.

As a prerequisite toward characterizing 5-HTR expression in the STG, I identified which 5-HTR subtypes exist in the marbled crayfish, *Procambarus virginalis*, the first decapod crustacean to have its genome and transcriptome published. To do this, I compared the transcriptome to ~6,280 available 5-HTR sequences from UniProtKB. This identified only two 5-HTR transcripts (5-HTR 1 and 5-HTR 7) located in distinct genome scaffolds. One transcript showed a high degree of homology to 5-HTR 1B from *Cancer borealis* (84%) and *Homarus americanus* (92%). The other was homologous (89%) to 5-HTR 7 from *H. americanus*. In addition, however, primer sequences that amplify 5-HTR 1 from red-swamp crayfish selectively aligned to an additional genome scaffold. BLASTX and protein2genome alignments indicated this scaffold encodes an additional 5-HTR. Collectively, these analyses suggest the marbled crayfish genome encodes three distinct 5-HTRs, in agreement with prior studies. By comparing the marbled crayfish transcripts and their respective genome scaffolds, I curated putative intronic and exonic regions for each 5-HTR. The putative 5-HTR 7 is 949 amino acids and contains 11 exons, whereas the putative 5-HTR 1 is 388 amino acids and contains only 4 exons. The uncharacterized gene that likely encodes an additional 5-HTR is 252 amino acids and contains 2 exons.

To establish temporal and spatial patterns of 5-HTR expression in the STG, I will first target cells that are known to respond to 5-HT (AB, IC, LP and VD neurons). For each cell type, the 5-HTR subtypes present, and their relative expression levels, will be determined through single-cell qPCR. More broadly, characterization of the temporal and spatial patterns of 5-HTR expression in the STG will facilitate the understanding of how individual 5-HTR subtypes might influence neuromodulation and flexibility in neural networks.

# PROFILING AGROCHEMICAL RESIDUES IN PRODUCE VIA PAPER CONE SPRAY IONIZATION AND PORTABLE INSTRUMENTATION

|            |  |
|------------|--|
| Presenter  | Gasa, Alyssa<br>Undergraduate, Chemistry                         |
| Mentor     | Prof. Christopher Mulligan                                       |
| Authorship | Alyssa Gasa; Shahnaz Mukta; Makoy Overfelt; Christopher Mulligan |

Toxicants such as pesticides and herbicides can pose various health risks to consumers when frequently exposed to these agrochemicals. The use of agrochemicals to enhance crop yield leaves the potential of trace residues to be left on vegetation that is then later consumed by humans and livestock alike. Trace screening for known pesticides from consumed foodstuffs allows for the determination of said exposures, as well as validating compliance with "organic" produce standards. Here, we present paper cone spray ionization (PCSI) coupled with portable mass spectrometric (MS) instrumentation as a promising method that is both rapid and robust in this endeavor.

Common and emerging agrochemicals of interest and both Certified Organic and non-organic fruits and vegetables were acquired from commercial sources. Home-built PCSI sources featured an outer layer of waxed weighing paper folded into a triangular pyramid, into which an inner cone of Whatman filter paper is placed; this inner cone serves as the bulk sample holder and spray solvent reservoir. This inner cone assembly serves to add on-board filtration of insoluble matrix. Preliminary testing was done on both commercial (Thermo LCQ Fleet ion trap MS) and portable (FLIR Systems AI-MS 1.2) MS instrumentation.

Preliminary, proof-of-principle testing sought to establish the efficacy of extraction and sensitivity of PCSI featuring on-board filtration towards that analysis of common foodstuffs. Prior to analysis, food products were roughly ground (with skins, if applicable) and placed into the filter paper insert. A majority of the profiled agrochemicals were observed as protonated molecules, with some observed as sodiated, potassiated, and/or hydrated ions stemming from the complex matrices examined.

For detection limit and quantitative assessments, organic produce was used as a standard matrix. Note that each organic candidate was thoroughly washed and examined pre-emptively via PCSI-MS to establish that no appreciable level of target pesticide was present. Known concentrations of target agrochemicals were added via dilute analytical standards to prepared food stuffs prior to analysis. Initial detection limits were determined to be in the low-to-high nanogram range, depending on analyte/foodstuff combination. Also presented in this work will be assessments of food-specific matrix effects and efficacy of filtration via the on-board filtration step.

# THE EFFECTS OF FACIAL OBSTRUCTION AND HAND GESTURES ON OBEDIENCE RESPONSE IN CANINES

Presenter

Gavin, Jennifer

Graduate, Psychology

Mentor

Prof. Valeri Farmer-Dougan

Authorship

Jennifer Gavin; Valeri Farmer-Dougan

Past studies have investigated the role that changes in cue presentation have on the ability of a dog to accurately respond to commands. In this study, facial obstruction and gestural cues were manipulated to determine the specific cues and features that dogs attend to when given a command. Faces were completely uncovered, had the mouth covered, the eyes covered, or the whole face covered during trials. Gestural cues were either present or absent for presentation of cues. Each individual cue was given three times to determine whether learning occurred during repetition. Three basic cues were chosen due to their prevalence in normal training: sit, down, and stay. Time to respond and accuracy of response were measured. Results showed changes in both accuracy and latency when features of the cue presentation were manipulated, suggesting that dogs attend to certain things within the environment in order to inform action. It was found that accuracy is consistently higher for cues including a gestural component and time to respond was shorter when a gesture was included. Overall accuracy increased with repetition of cues and dogs were quicker to respond following repetition. This study showed that dogs attend to several different features within an obedience cue presentation, and manipulation of those features changes the ability of a dog to accurately respond.

# THE EFFECT OF THINKING ABOUT BEING EXCLUDED BY GOD ON WELL-BEING: A REPLICATION AND EXTENSION

|           |                       |
|-----------|-----------------------|
| Presenter | George, Anna          |
|           | Graduate, Psychology  |
| Mentor    | Prof. Eric Wesselmann |
| Co-Mentor | Prof. Joe Hilgard     |

Diverse samples and replication are two important aspects of scientific research. Our research will attempt to replicate a previous study (van Beest & William, 2011) which examined how Christians being led to believe God will either include or exclude them in the future influenced well-being scores. Christian participants reported more threat to their psychological needs (e.g., self-esteem) when led to believe God would exclude them (compared to participants in the inclusion and control conditions). In other words, when Christians believed they would one day be excluded by their God, their well-being suffered. We are replicating this study by collecting data from two separate sites (i.e., a public university and a private, religious-based university). Data collection is currently in progress. We will analyze the effect of our experimental manipulation (i.e., inclusion God, exclusionary God, control condition) on Christian participants' psychological need satisfaction, as well as examine how participants' self-reported commitment to God influences these effects. We will conduct a mini meta-analysis on our data and the original authors' data to establish a population effect size for the main effect. These results will add to the literature on when religion is helpful or harmful to mental health and may be influential to the counseling community when assisting religious clients.



# SMELLS LIKE TROUBLE: HARVESTMAN CHEMORECEPTION AND THE PHEROMONE AVOIDANCE HYPOTHESIS

|            |   |
|------------|---|
| Presenter  | Goldberg, Daniel<br>Graduate, Biological Sciences                                 |
| Mentor     | Prof. Steven Juliano  |
| Co-Mentor  | Prof. Rachel Bowden   |
| Authorship | Daniel Goldberg; Kerrigan Tobin; Kristina McIntire; Rachel Bowden; Steven Juliano |

The pheromone avoidance hypothesis holds that prey animals can detect chemical signals (or pheromones) that are produced by their predators, and that prey should avoid areas where they detect pheromones because they recognize them as a threat of a nearby predator. While a variety of prey animals have been tested under this hypothesis, few behavioral studies have examined how arachnids may exhibit this avoidance behavior, as most studies of arthropods have focused on insects and crustaceans. Harvestmen (*Prionostemma* spp.), which rely primarily on chemical detection (chemoreception) for navigating their world, and use a variety of defensive behaviors to evade predators, are amenable test subjects for manipulative studies of pheromone avoidance. For this experiment, I sampled harvestmen at the La Selva Biological Station in Costa Rica, where these arachnids are abundant and coexist among a diversity of ant species, which lay down pheromone trails for other ants to follow, and include known harvestmen predators. Through three-way choice trials, in which I allowed a harvestman to move around an enclosure laced with two types of ant pheromone-treated filter paper and an odorless control, I discovered that Costa Rican harvestmen did not significantly avoid paper laced with trail pheromone of the predatory army ant (*Eciton burchellii*) over the course of several days after the ant pheromones were collected. However, on the first day of the choice trials, harvestmen did avoid army ant trail pheromone more than the trail pheromone of the harmless leafcutter ant (*Atta cephalotes*), and avoided both pheromones more than the odorless control paper. As harvestman avoidance of *Eciton burchellii* trail pheromone fell with each subsequent day of choice trials, it appears that these arachnids can identify the chemical cues of predatory ants as dangerous and will take evasive action, but harvestman avoidance responses should be strongest when this ant pheromone is freshest.

# PROSPECTIVE MEMORY AND PRE-CRASTINATION IN A DUAL COGNITIVE TASK

|            |  |
|------------|--|
| Presenter  | Graf, Abigale<br>Undergraduate, Psychology |
| Mentor     | Prof. Dawn McBride                         |
| Authorship | Abigale Graf                               |

Prospective memory is remembering to complete a task in the future and tends to be cognitively taxing. Precrastination is the tendency to complete a task sooner to reduce cognitive load. The current study assessed prospective memory and precrastination with two blocks of a lexical decision task. Undergraduate participants were instructed to complete two blocks of the lexical decision task and were randomly assigned to beginning, middle, end, or choose conditions to complete the prospective memory task, which was generating a list of items from a given category. A control group completed the ongoing lexical decision task alone to compare the average response times without an additional task. The ongoing response times from the blocks of the lexical decision task will be recorded and compared between conditions. Participants in the assigned conditions were compared with the choose condition to compare the response times of those who precrastinated. First, we expect more participants in the choose condition to pre-crastinate by generating their list first than in the middle or end. Additionally, participants should demonstrate longer ongoing response times prior to generating the list than after completing the list.

# NONCONTINGENT PRAISE: EFFECTS OF PRAISE ON REPRIMANDS

|            |                                       |
|------------|---------------------------------------|
| Presenter  | Grage, Casey<br>Graduate, Psychology  |
| Mentor     | Prof. Gary Cates                      |
| Authorship | Casey Grage; Kelly Poirot; Gary Cates |

Noncontingent praise (NCP) is a nonintrusive intervention strategy that can be readily used by teachers at all grade levels. Training teachers to increase their use of praise can improve student disruptive and off-task behavior (Floress, Beschta, Meyer, & Reinke, 2017). This study examines the rates of three different types of praise: process, person, and general. Process praise is a behavior-specific praise, targeting a specific effort of the student. Person praise is a praise based on an attribute of a student. General praise is general statement of approval, without specifying the behavior or effort.

The study also examines the rates of reprimands, defined as a rebuke or negative attention, before and during the NCP intervention. The purpose of this study is to assess the use of total, process, person, and general praise and compare it to the total use of reprimands utilized before implementing a noncontingent praise intervention and during.

Participants included six teachers and their classrooms at an elementary school. Sessions were conducted in 20-minute intervals during a group activity. A frequency count form was utilized to count the number of general praise, process praise, person praise, and reprimands that were utilized throughout the observation. The data was recorded on the Classroom Behavioral Observation Form (Cates, 2011).

A multiple baseline design across participants was utilized. During baseline phase, the teacher was instructed to respond to the class as she normally would. Trained graduate clinicians took a frequency count of the specific praises and reprimand. Between the baseline and intervention phase, the teachers were trained on NCP and its benefits, including the differences between general, process, and person praise. During the intervention phase, the teacher was provided with a MotivAider™ that vibrated on a predetermined schedule based on the frequency of praises given during baseline. The MotivAider™ for classrooms 1-3 was set on a fixed schedule of reinforcement and classrooms 4-6 was set on a variable schedule of reinforcement. The teacher was instructed to provide class-wide (e.g., 3 or more students) praise statement every time the MotivAider™ vibrated.

Results suggests that a fixed schedule of reinforcement yields the highest reduction in reprimands. It also appears that the use of praise significantly increases when the teachers are trained to utilize NCP. Furthermore, results demonstrate that process praise increased the greatest in a fixed schedule of reinforcement and general praise increased the greatest in a variable schedule of reinforcement.

# RELAPSE AND RECIDIVISM AMONG CLIENTS WITH DUAL DIAGNOSIS IN THE CSU AT CHESTNUT IN BLOOMINGTON, IL.

Presenter

Hailu, Bethlehem  
Graduate, Social Work

Mentor

Prof. Kate Sheridan

This study explores factors associated with relapse and recidivism among clients with dual diagnoses (substance use disorder and mental illness) receiving services in the Crisis Stabilization Unit at Chestnut in Bloomington. Sources of data include brief interviews with clients within 24 hours of prior to discharge to explore factors associated with their return to Chestnut for services. Participants are invited to participate in a brief interview as part of their discharge process. Potential participants will be screened prior to subject recruitment to determine eligibility requirements. The inclusion criteria are diagnoses of both a mental health disorder and substance use disorder and prior admittance into the CSU within the previous 6 to 12 months. Clients with a mental health diagnosis that includes psychotic features will not be eligible to participate in the study. Findings from the study will inform staff and administrators of factors associated with relapse and recidivism specifically regarding the interplay with mental health.

# IT'S NOT YOU, IT'S ME...OR IS IT BOTH? AN INTERACTION BETWEEN MALE AND FEMALE GENOTYPE ON FEMALE POST-MATING IMMUNITY

|            |  |
|------------|--|
| Presenter  | Hampton, Kylie Graduate, Biological Sciences             |
| Mentor     | Prof. Scott Sakaluk                                      |
| Co-Mentor  | Prof. Ben Sadd   |
| Authorship | Kylie Hampton; Kristin Duffield; Scott Sakaluk; Ben Sadd |

Mating influences female immune responses across an array of insect taxa. In some species, the female immune system may respond to the components of the male ejaculate as foreign antigens, causing an alteration in immunity. In addition, males, for their own benefit, may transfer certain compounds to females that function to manipulate the balance between female immunity and reproduction. How the genotype of the ejaculate donor and the female's own genotype might interact to influence female immune responses remains unknown. The objective of this study was to determine how mating status and genotype of a female interact with the genotype of her mate to affect female immune responses. Using individuals from genetically distinct inbred lines, female decorated crickets were randomly assigned to a mating status, either mated or virgin. Experimental females from any given line were randomly paired with a male either from the same genetic line or a different genetic line. Immune function of mated and unmated females was assayed by: i) counting circulating hemocytes, ii) measuring the activity of an enzyme in the melanization immune response, phenoloxidase, and iii) assaying antibacterial activity. Preliminary data suggest that male genotype interacts with female genotype, resulting in differences in immune function between mating treatments that are contingent on genetic line. These results indicate that mating status and genotype affect female immunity in a complex manner, suggesting that female immune traits are context-dependent.

# VOICES FOR PERSONS WITH INTELLECTUAL AND DEVELOPMENTAL DISABILITIES: A LOOK AT POSTSECONDARY EMPLOYMENT

|            |  |
|------------|--|
| Presenter  | Harris, LaTonya<br>Graduate, Special Education       |
| Mentor     | Prof. Lydia Kyei-Blankson                            |
| Co-Mentor  | Prof. Debbie Shelden                                 |
| Authorship | LaTonya Harris; Lydia Lydia-Blankson; Debbie Shelden |

Parental involvement and understanding of the postsecondary process continues to be a positive predictor of students with disabilities achieving goals upon exiting high school (Test, Mazzotti, & Mustain, 2018). Understanding the families' expectations, priorities, and concerns associated with postsecondary outcomes can assist all stakeholders in developing programming and partnerships to support the student toward their stated goals. This study extends the research completed by Blustein, Carter, and McMillan (2016) which investigated parental views on post school employment for persons with intellectual and developmental disabilities (IDD). Local agencies servicing persons with IDD were employed to recruit parents to complete the survey. Correlation and descriptive statistics were used to present the findings of the survey responses. Major findings were parents preferred part- time community employment over other settings; parents valued interpersonal relationships over work opportunities; a moderate positive relationship between race and parental prediction of employment setting upon exiting high school; and no relationship between school interactions to parental prediction of the employment setting. Implications and recommendations are discussed to support persons with IDD and their family in achieving employment outcome.

# CAN A WEARABLE NEUROMUSCULAR DEVICE REPLACE NEUROMUSCULAR TRAINING PROGRAMS?

Presenter

Higinbotham, Sean  
Graduate, Kinesiology & Recreation

Mentor

Prof. Michael Torry

Authorship

Sean Higinbotham; Ryan Wexler; Danny Blake; Carlie Harrison;  
Justin Hollenbeck; Michael Torry; Michael Decker

**Background:** Scientific studies have shown female soccer athletes to be 3 times more likely to injure their anterior cruciate ligament (ACL) than their male counterparts and the majority of these injuries are from a non-contact mechanism. Preventive neuromuscular training programs are typically field-based and have been shown to be an effective intervention for reducing ACL injury risk by improving dynamic, frontal-plane knee stability. **Purpose:** The aim of this study was to evaluate the effectiveness of a wearable neuromuscular device (WND) with or without the addition of a field-based, preventive neuromuscular training program on jump-landing risk assessment in young female soccer athletes. **Methods:** 39 female soccer players ( $161.0 \pm 6.6$  cm;  $49.4$  kg  $\pm$  5.9;  $13.3 \pm 0.5$  y) from two teams in a local soccer club volunteered to participate in this study. Team 1 (n = 25) performed a 6-week, field-based NMT program wearing WND's. Field-based movement testing was performed before training began (pretest) and in the seventh week upon completion of the NMT program (post-test). During testing, video cameras recorded jump-landing tasks in the frontal and sagittal planes. The Landing Error Scoring System (LESS) and the LESS-RMC was used to assess movement quality related to ACL injury risk. Team 2 (n=14) wore the WND for an equal amount of athletic exposures over 7-weeks but did not perform the NMT program. Four raters visually scored all jump-landing trials using the two rating protocols during the pre-test and post-test. For each visual assessment (LESS & LESS-RMC) a repeated measures ANOVA was conducted to explore within group (test) and between group (team) differences. **Results:** Repeated measure ANOVA results for the LESS scale indicated pretest scores for team 1 ( $6.18 \pm 1.68$ ) and team 2 ( $6.95 \pm 0.94$ ) both saw a significant reduction in ACL injury risk to  $5.44 \pm 1.70$  and  $6.31 \pm 1.75$ . ANOVA results for the LESS-RMC scale also indicated pretest scores for team 1 ( $6.02 \pm 1.99$ ) and team 2 ( $6.49 \pm 1.33$ ) both saw a significant reduction in ACL injury risk scores to  $5.10 \pm 1.77$  and  $6.09 \pm 1.50$ . ANOVA results revealed no significant differences between the two teams risk scores. **Conclusion:** The results reveal that the NMT program utilized in this study had no significant additive effect on the visual risk assessment scores for Team 1 compared to Team 2, who had no intervention and only wore the WND.

# CONNECTING THE DOTS ON EGGSHELL PIGMENTATION: THE RELATIONSHIP BETWEEN PIGMENTATION AND FEMALE AND OFFSPRING CONDITION AND MALE PROVISIONING EFFORT

|            |   |
|------------|---|
| Presenter  | Hodges, Kara<br>Graduate, Biological Sciences                         |
| Mentor     | Prof. Scott Sakaluk   |
| Co-Mentors | Prof. Charles Thompson and Prof. Alysia Vrailas-Mortimer              |
| Authorship | Kara Hodges; Alysia Vrailas-Mortimer; Charles Thompson; Scott Sakaluk |

Despite a wealth of research in avian breeding ecology, little is known regarding the mechanisms or functions of the different pigments maternally deposited into eggshells. One hypothesis posits that shell pigmentation is an honest signal of female quality by reflecting her level of oxidative stress, one that may be used by males to influence paternal investment. Support for this hypothesis has been mixed, especially in regards to the brown pigment protoporphyrin. Using a cross-fostering design we tested whether clutch pigmentation correlates to either female or offspring fitness metrics or male provisioning effort in house wrens (*Troglodytes aedon*), a species that lays eggs dominated by protoporphyrin. We found no effect of clutch pigmentation, foster-parent clutch pigmentation, or their interaction, on female or offspring mass or tarsus length, nor was there an effect on nest success. We conclude that neither perceived nor actual clutch pigmentation is an indicator of female or offspring quality with respect to our fitness metrics. We are currently analyzing the effects of clutch pigmentation on female and offspring oxidative stress as well as on male provisioning effort.



# **ANALYZING THE EFFECTIVENESS OF THE MCLEAN COUNTY CRIMINAL JUSTICE COORDINATING COUNCIL USING DESIGN SOCIOLOGY**

|            |   |
|------------|---|
| Presenter  | Holifield, Jalisa<br>Graduate, Sociology/Anthropology |
| Mentor     | Prof. Frank D. Beck                                   |
| Co-Mentor  | Prof. Rick Valentin                                   |
| Authorship | Jalisa Holifield                                      |

The standards for criminal justice structure and organization are discussed and debated from many positions. The limitations and inefficiencies of a hierarchical and bureaucratic system greatly hinder the possibilities of effective communication and collaboration within it. To address these unique issues design sociology (DS) can be applied.

Design Sociology (DS) inspires positive social change by approaching research through an action or applied research method. These methods center the end user's perspective and has the potential to re-imagine processes that produce unfavorable results for the majority of users. Concepts of DS can be applied to any institution or organization, especially to address issues with communication and collaboration that arise between arms of the same institutional body, like the criminal justice system.

The criminal justice system in Illinois is comprised of numerous independent agencies that work parallel to one another. Characterized by these agencies operating in silos, effective communication and collaboration can be hard to come by. The National Institute of Corrections created Guidelines for Developing a Criminal Justice Coordinating Committee (2002) to assist criminal justice system members who wish to improve communication, cooperation, and coordination in their areas. One method of addressing these issues is through the creation of a Criminal Justice Coordinating Council (CJCC). Although CJCC's have existed since the 1970's, they are unique to each county or jurisdiction that employs them. The National Jail Exchange (NJE) published three common characteristics of effective CJCC's in 2013. These include an engaged membership lead by an effective leader, appropriate planning staff and a structured, data-driven and collaborative policy approach. Using the three NJE characteristics, a quantitative survey of CJCC members, and qualitative interview of CJCC administrators, this paper will analyze the effectiveness of the CJCC in McLean County. The paper will conclude with recommendations based in design sociology.

# TEACHER AND STUDENT PERCEPTIONS OF CULTURE AND COMMUNITY AT MACOMB HIGH SCHOOL

|           |  |
|-----------|--|
| Presenter | Horrell, Chandler<br>Graduate, Social Work |
| Mentor    | Prof. Kate Sheridan                        |
| Author    | Chandler Horrell                           |

This study explores the academic and social culture and community at Macomb High School from the perspective of teachers and students. Sources of data include a teacher survey and a student survey. The teacher survey explores teacher perception of the roles and relationships of being a teacher in relation to students, colleagues, parents, and the school as a whole. The student survey explores student perceptions of their environment and relationships in relation to teachers, peers, and the school. Participants include 140 high school teachers and 600 high school students (grades 9-12). Findings from the study will inform stakeholders about strengths and challenges faced by teachers and students at Macomb High School.

# HIP ADDUCTOR VS. HIP ABDUCTOR STRENGTH RATIO IN PATIENTS WITH LOW BACK PAIN

Presenter

Hugg, Matthew

Graduate, Kinesiology & Recreation

Mentor

Prof. Noelle Selkow

Co-Mentor

Prof. Justin Stanek

Authorship

Matthew Hugg; Noelle Selkow; Justin Stanek

The objective of this study is to test for differences in hip abductor and hip adductor musculature in patients with and without low back pain (LBP). Concurrently, the researchers will produce a strength ratio measurement for the corresponding muscles in both healthy and LBP populations. No conclusions have been drawn between the difference in strength of the hip adductor and hip abductor muscles in those with and without LBP. In many studies, research has shown a decrease in strength of the hip abductors in patients with LBP. The hip abductors also have important roles in stabilizing the pelvis while walking. The hip adductors attach to the pubic symphysis and assist in stabilizing the pelvis. Due to the ability to activate and assist with hip and leg motions, the adductor muscles may have an effect on controlling hip motion to reduce LBP and sacroiliac dysfunction. However, it is unknown how the hip adductors respond in those with LBP.

The participants in this study were allocated into either a control or experimental group based on the inclusion criteria. For the control group, the participant must have no pain, 0% on the Oswestry Disability Index (ODI), 0 on the Visual Analogue Scale (VAS), and be between the age of 18-40. For the experimental group, the participant must have at least a 3 on the VAS, 20-40% on the ODI, qualified 3 out of 4 of the clinical predictor rules for LBP, and between the age of 18-40. Those with previous surgeries, a specific diagnosis of LBP, or current pregnancy, were excluded from the study.

Participants will perform a straight leg raise (SLR) for hip adduction and hip abduction of both legs. Participants are instructed to perform a SLR at maximal force 3 times in both directions on each leg. Data will be recorded using a hand-held dynamometer connected to a belt to enforce an immovable object. The highest value of the 3 trials will be used, and strength values will be normalized to sex.

The researchers hypothesize there will be observable differences between both groups in the hip adductors and hip abductors. We expect to see the hip adductors increase in strength in order to stabilize the femur in participants with LBP. This information will allow a calculated ratio measurement to be created and provide essential information in aiding future LBP rehabilitation and treatment.

# **MICROPLASTIC CONCENTRATIONS IN GIZZARD SHAD (DOROSOMA CEPEDIANUM) AND LARGEMOUTH BASS (MICROPTERUS SALMOIDES) FROM TWO DRINKING WATER RESERVOIRS IN THE MIDWESTERN UNITED**

|           |   |
|-----------|---|
| Presenter | Hurt, Raven<br>Undergraduate, Biological Sciences |
| Mentor    | Prof. Bill Perry                                  |
| Co-Mentor | Prof. Catherine O'Reilly                          |

The emergence of micro plastics as a widespread contaminant in marine and freshwater environments has been cause for concern. Not only can these particles be a source of persistent organic pollutants and harmful microbial assemblages, but micro plastics also have the potential to impact feeding and physiological functions of organisms. To date, most environmental and ecological studies of micro plastics have focused on marine systems. Research in freshwater environments has been limited, especially with respect to ingestion across trophic levels. In this study, we explored micro plastic concentrations in freshwater fish and whether these concentrations were influenced by landscape or food web characteristics. We sampled gizzard shad and largemouth bass from two drinking water reservoirs in the central Midwest that have differing shoreline land use patterns. We anticipated that the reservoir with permanent residences would have greater micro plastic concentrations than the one in protected parkland. We examined whether feeding guild influenced where micro plastics were concentrated within fish and whether there was evidence of trophic transfer. Our results to date indicate that micro plastics concentrations are similar to those found in riverine fishes, although generally slightly higher.

# WORRIED ABOUT THIS POST? HOW BULLYING INFLUENCES MENTAL DISTRESS

|            |   |
|------------|---|
| Presenter  | Hynes, Keeley<br>Graduate, Psychology                     |
| Mentor     | Prof. Leandra Parris                                      |
| Co-Mentor  | Prof. Daniel Lannin                                       |
| Authorship | Ani Yazedjian; Leandra Parris; Daniel Lannin; Mayaan Dvir |

## A. Purpose

Understanding the effects of social media is an important area of study because 95% of adolescents report having a smartphone and nearly half admit they are "online almost constantly" (Anderson & Jiang, 2018). Students engaging with social media may be inundated with self-presentation concerns (Seidman, 2013), a process that may be subsumed by a person's tendency to engage in rumination (Feinstein et al., 2013). Although rumination-more generally defined-has been examined, there is a need to examine rumination that is social-media specific. Further, while social media usage has been examined in relation to cyberbullying (Best, Manktelow, & Talor, 2014), how social media is linked to face-to-face bullying is less clear. Therefore, the current study examines the mediating effect of social media rumination on the relationship between bullying and mental health distress.

## B. Procedure

During fall of 2018, in Champaign county, 171 youth aged 15-19, participating in the Champaign Area Relationship Education for Youth (CARE4U) program, completed pretest survey data. Participants completed questionnaires assessing social media rumination, mental distress, and bullying. Surveys were administered on tablets once parent permission and child assent were obtained.

## C. Results

To determine the structure of the social media rumination scale, a series of analyses were conducted. First, a parallel analysis was conducted to determine factor retention (Hayton, Allen, & Scarpello, 2004) followed by a principle component analysis. Of the 19 original items (e.g., "I worry about how people will react to my social media posts."), 7 were dropped resulting in a 12-item scale ( $\alpha = .88$ ). Next, we computed the indirect effect of bullying on mental distress through social media rumination in SPSS 25 utilizing Hayes (2013) PROCESS model. Results supported the mediation hypothesis, indicating that the indirect effect from bullying to mental distress, through social media rumination, was significant ( $\beta = 0.07$ , 95% CI = [0.02, 0.14]),  $R^2 = .16$ .

## D. Conclusions

Our study demonstrates that youth who experience bullying increase their rumination of social media-related experiences, and subsequently experience greater distress. That is, social media rumination is one process through which bullying influences youth's mental health functioning. It is possible that traditional bullying experiences cause youth to be more anxious or worried about their experiences online. Future research is warranted to expand this study and continue to validate this new social media rumination scale.

# EPISTEMOLOGICAL JUSTIFICATION: AN INVESTIGATION OF KNOWLEDGE

|            |  |
|------------|--|
| Presenter  | Iguodala, Rendell<br>Undergraduate, Philosophy |
| Mentor     | Prof. Daniel Breyer                            |
| Authorship | Rendell Iguodala                               |

Human beings possess a great amount of potential. Constituting this potential are the tendencies of motion and thought. In terms of physicality, the tendency to move may be explained from an anatomical and physiological perspective. It may also be appropriate to explain the motion of human beings through the use of physics. The tendency of thought may be explained in term of a behavioral science such as psychology, and the Science, a discipline that is reputable for providing information found in research, is a discipline that often encourages certainty. This certainty or assured attitude about the world and objects in the world often inclines people toward other tendencies such as claiming to have knowledge. However, there are various challenges to consider when determining whether knowledge can be had, and this investigation is intended to reveal those challenges.

# THE RELATIONSHIP BETWEEN CHILDHOOD SEXUAL ABUSE AND HOOKUP EXPERIENCES

|            |                           |
|------------|---------------------------|
| Presenter  | Jackson, Jamilah          |
|            | Undergraduate, Psychology |
| Mentor     | Prof. Corinne Zimmerman   |
| Co-Mentor  | Prof. Marla Reese-Weber   |
| Authorship | Jamilah Jackson           |

The purpose of this study is to examine how a history of childhood sexual abuse (CSA) is related to hookup experiences. Participants included 186 undergraduate college students at Illinois State University, 84.9% were women. Participants completed a questionnaire that determined their history of childhood sexual abuse and their hookup experiences. We expect individuals with a history of CSA to be more likely to report hookups than individuals without a history of CSA. Those in the CSA group are also expected to be more likely to report hookups that involved strangers and alcohol than those in the non-CSA group. Implications of this study will be discussed.

# STEREOTYPE PROXIMITY THEORY

|            |  |
|------------|--|
| Presenter  | Jackson, Terry<br>Graduate, Educational Administration & Foundations |
| Mentor     | Prof. Gavin Weiser   |
| Authorship | Terry Jackson  |

The purpose of this research is to further the understanding of how individual's interactions are impacted by stereotypes by constructing a predictive model that illustrates what possible actions an individual might take in any given situation. I conducted research of extant literature to better understand the variety of negative effects that stereotypes can have on students and adults alike. Identifying the threats that stereotypes pose has served as a way for professionals in education to help minimize certain obstacles to achievement, as well as maximize the student's learning environment.

Stereotype proximity theory (SPT) attempts to conceptualize the decision-making process performed by individuals when considering whether to participate in a given activity that resembles a historical or contemporary stereotype. The aspects of SPT culminates in a decision matrix that illustrates an individual's predicted participation level in a given activity based on several internal and external factors. Leaning on the foundations of both game and decision theory ((Parmigiani & Inoue, 2009; Grune-Yanoff, 2018) the framework of Stereotype Proximity Theory was created using concepts from stereotype threat theory the components of the model were constructed. This model can be generative for educators because it allows those working with students to better predict how educational programming might develop students' ability make better decisions when faced with similar situation in the future. In addition to programming, educators involved in any type of advisement or coaching of students would be able to draw from the model when working through decision-making skills and patterns.



# INVESTIGATING THE ROLE AND RELATIONSHIP OF PINK1 AND PARKIN IN COPPER TOXICITY AND MENKES DISEASE

|            |                               |
|------------|-------------------------------|
| Presenter  | Jett, Mason                   |
|            | Graduate, Biological Sciences |
| Mentor     | Prof. Alysia Mortimer         |
| Authorship | Mason Jett; Alysia Mortimer   |

Menkes disease is an X-linked recessive disorder in humans that is characterized by misregulation of copper, which is due to a mutation in the P-type ATPase copper transporter ATP7A. ATP7A is found in the trans-Golgi network under basal conditions, delivering copper for synthesis of important cuproenzymes. Under excessive copper conditions, ATP7A translocates to the plasma membrane and pumps excessive copper out of the cell to be eliminated. The Menkes disease phenotypes include neural developmental and growth defects, sparse, kinky hair, and lethality at a very early age (~3 years old). Defects in copper transport mean that the neurons are not getting the copper they need, and instead the copper is accumulating outside of neuronal cells, leading to toxicity. A common destination for copper within the cell is the mitochondria, as Cytochrome Oxidase C is a cuproenzyme. Toxic levels of copper can damage the mitochondria, which result in dysfunctional mitochondria and death of the cell in some neurodegenerative diseases. To combat this, the mitochondria have a protective system to avoid cellular apoptosis, which can be triggered by the release of Cytochrome oxidase C, and this involves the degradation of the organelle. PINK1 is a serine/threonine kinase that resides in the outer mitochondrial membrane and throughout the cytosol. When a mitochondrion is damaged, the membrane potential changes, and this is the signal PINK1 picks up. PINK1 then recruits parkin, an E3-ubiquitin ligase, which ubiquitinates the mitochondrion marking it for lysosomal degradation. The goal of my work is to test the relationship between PINK1, parkin, and ATP7A under toxic copper stress conditions and investigate whether genetic manipulation of these genes can rescue some of the Menkes phenotypes caused by copper imbalance.

# HOW WELL SOCIALIZED ARE FIRST YEAR SOCIAL WORK STUDENTS FOR THE SOCIAL WORK PROFESSION?

|           |                               |
|-----------|-------------------------------|
| Presenter | Johnson, Sarah                |
|           | Graduate, Social Work         |
| Mentor    | Prof. Kathryn Conley Wehrmann |
| Author    | Sarah Johnson                 |

Educators and employers strive to teach specific standards to their students and employees regarding professional socialization. The field of social work is no different in efforts to establish key features and norms for professional socialization. Socialization is defined as the process where an individual learns to adjust to a group and behave in a manner approved by the group (Persell, 1990). This process of socialization is the driving force behind job preparedness for the field of social work. Unfortunately, there is a learning gap that is impacting the preparedness of newly graduated hires in the social work. This exploratory research will find out how well socialized first-year social work students are for the social work profession. To understand the level of socialization for social work students, surveys will be used to gather their perceptions of personal socialization. If Illinois State University (ISU) Bachelors of Social Work (BSW) students are evaluated on their perceptions of personal levels of professional socialization, then the gathered information can be a foundational resource in addressing the social work literacy gap.

Both qualitative data and quantitative data will be gathered and used in this study to overcome the limitations of a survey and to rule out bias using open-ended questions. Using both a survey for quantitative data and open-ended questions for qualitative data gives a full scope of perceptions of professional socialization by ISU BSW students. All junior BSW students attending Illinois State University will have the opportunity to participate in the study. The study survey distributed in a BSW class and completed on a voluntary basis. The opened-ended questions will address racial diversity factors, age, and social-cultural factors. The data will be tabulated to give a comprehensive picture of student responses and assist in identifying patterns. Descriptive statistics will be used to analyze the data. After tabulating the data, further analysis of the data will be done by disaggregating it across different variables and subcategories of variables. Quantitative data analysis will be carried out using SPSS. The qualitative data will be transcribed and a thematic analysis will be completed.

# INVESTIGATIONS INTO THE SYNTHESIS OF NOVEL CARBAPORPHYRINOIDS USING A '3 + 1' APPROACH

|            |                             |
|------------|-----------------------------|
| Presenter  | Kempel, Samuel              |
|            | Undergraduate, Chemistry    |
| Mentor     | Prof. Timothy Lash          |
| Authorship | Samuel Kempel; Timothy Lash |

Porphyrins are macrocyclic compounds that have been widely investigated over the past century. These natural products are aromatic systems that have numerous applications. Due to the valuable properties exhibited by porphyrins, related macrocycles have also been investigated. In this work, syntheses of carbaporphyrinoid systems have been investigated. Dialdehydes derived from Diels-Alder adducts have been reacted with a tripyrrane under acidic conditions in an attempt to generate carbachlorins. In addition, the formation of a novel quiniporphyrin structure with a quinoline unit in place of one of the usual pyrrole rings is under investigation. The strategy devised to prepare this structure involves reacting a quinoline dialdehyde with a tripyrrane under acidic conditions. It is anticipated that quiniporphyrins will be effective organometallic ligands that can potentially form bimetallic derivatives.

# DUTY TO OBJECT

|            |   |
|------------|---|
| Presenter: | King, Patrick Undergraduate, Philosophy |
| Mentor     | Prof. Daniel Breyer                     |
| Authorship | Patrick King                            |

Philosophical discourse has historically placed a great emphasis on the duty to object. Plato and Socrates saw the search for truth as a dialectic in which ideas are challenged and new ones formed while still maintaining the essence of the original. This sentiment is mirrored in the 19th by G. W. F. Hegel, who believed that the progression of human history was nested within such a dialectic, which pushed us towards ultimate realization. Even today, the peer review process used by academic journals aims to challenge potential articles and weed out problematic assertions. What are the philosophical underpinning of this so called duty to object, and does this duty extend beyond academia?

# IMPACTS OF LAND-USE CHANGE ON THE MENOMINEE RIVER IN JO DAVIESS COUNTY, ILLINOIS

Presenter

Konop, Preston

Graduate, Geography, Geology, and the Environment

Mentor

Prof. Lisa Tranel

This study will address land-use changes in Jo Daviess County, Illinois, and their effects on the Menominee River. The Menominee River flows north to south through Jo Daviess County, Illinois and southern Grant County, Wisconsin. Many of the surrounding properties are agricultural and have undergone developmental and land-use changes that may affect the flood flashiness of the Menominee River. Increases in impermeable surfaces may have led to greater amounts of runoff during precipitation events causing more sediment to wash into the river. In addition, more intense or longer duration precipitation events related to changing climate may create greater amounts of runoff moving over the landscape and into the Menominee River. The concerns with increasing flood flashiness of the Menominee River include more frequent flooding events, undercutting of river banks, and increased amounts of sediment transport from upstream locations into the Mississippi River. Along with the sediment loss by runoff, the risk for chemical contaminants, including agricultural chemicals, road salt, and automotive fluids increases. Chemicals in runoff water can be transported downstream and pollute drinking water, while sediment loss reduces the amount of viable cropland within the watershed. Large scale precipitation events also cause more water to flow into the Menominee River rather than infiltrate into the ground, resulting in an increased risk of flood events. Flooding events pose risks to cropland and subdivisions that reside near the Menominee River, which are subject to property or crop damage. This study will investigate potential relationships between the changes in land-use from agricultural to urban impermeable surfaces and river flow during flood events. A model will determine changes to flood discharge over time in the Menominee River, and how those changes correspond to the increase of impermeable surfaces. Changes in land-use and the stream network will be identified through land cover classifications using digital elevation models (DEM) and aerial imagery. Weather pattern data will be collected for the study area in order to determine weather patterns that occurred over the study period. The expected results are that the increase of impermeable surfaces such as buildings and roads will increase the flashiness of the Menominee River.

# THE UTILIZATION AND PERCEPTION OF STUDENT AIDES IN THE SECONDARY SCHOOL ATHLETIC TRAINING SETTING

Presenter

Kovalsky, Andrea  
Graduate, Kinesiology & Recreation

Mentor

Prof. Noelle Selkow

**Objective:** Many athletic trainers in the secondary school setting utilize athletic training student aides in various capacities. The National Athletic Trainers' Association (NATA) published an Official Statement on the appropriate use of student aides in 2014. Since then, there has been a dearth of research on athletic trainers' adherence to the official statement, however. The purpose of this qualitative research study was to determine to what extent secondary school athletic trainers (SSATs) are following the NATA Official Statement on Proper Supervision of Secondary School Student Aides, and to determine what the perceived value of student aides are in the secondary school setting.

**Design and Setting:** The study was conducted using an online survey to assess SSATs perceptions of student aides and of the Official Statement. The survey was based on the Official Statement's guidelines. Content validity was established through a review of the instrument by a panel of experienced athletic training researchers. The survey was distributed to 1000 athletic trainers across the country, as well as shared on a pertinent athletic training social media group (the Secondary School Athletic Trainers Facebook group), by a group administrator who was not associated with the study. Subjects were also invited to participate in a follow-up phone interview, in order to clarify answers from the initial survey and glean wider perspectives about student aides.

**Subjects:** Subjects were currently practicing secondary school athletic trainers across the United States. They did not have to have student aides to be eligible to participate in the study. Subjects had opted into the NATA's survey distribution program, and were randomly selected from that program's database.

**Results:** One hundred forty-five subjects participated in the online survey, and 24 of those subjects participated in the interviews. Data is currently being analyzed from the survey results and interview transcriptions. We expect to discover what percentage of participants have student aides in their setting, and to what degree they allow their students to participate in various activities listed in the Official Statement. As well, we expect to learn subjects' opinions of the utilization of student aides in the secondary school setting.

**Conclusions:** As data analysis continues, conclusions will be drawn regarding the objectives of this study. We expect to draw conclusions on the current opinion of the Official Statement, as well as SSATs' adherence to it.

# WATERSHED CHARACTERIZATION AND STREAMFLOW FORECASTING USING REMOTE SENSING AND MACHINE LEARNING

|            |   |
|------------|---|
| Presenter  | Kwon, Dongjae                                     |
|            | Graduate, Geography, Geology, and the Environment |
| Mentor     | Prof. Wondwosen Seyoum                            |
| Authorship | Dongjae Kwon; Wondwosen Seyoum                    |

Historically and recently, many people have suffered from severe droughts and/or flooding due to climate changes. In the future, 10-40% of streamflow may be decreased or increased according to accelerated climate changes. Consequently, governments around the world will face a serious challenge regarding water resources management strategy. Since the Rainfall-Runoff (R-R) process is one of the fundamental factors of the hydrological cycle, it is necessary to establish and monitor the rainfall and streamflow responses in various watersheds to attain effective water resource management policy. However, the R-R process is not a function of a single variable but a function of multiple variables such as precipitation, evapotranspiration, infiltration, and topography, which means the streamflow process is complex and is highly nonlinear. Furthermore, most of the watersheds around the world are ungauged which means field measured data could be scarce in many cases. These constraints could increase the uncertainties of streamflow predictions from conventional approaches such as process-based models and simple empirical models. Machine learning techniques combined with remote sensing data can be an effective tool to overcome the difficulties. The main objective of this study is to characterize a watershed and evaluate the effectiveness of a machine learning-based hydrologic model in simulating the water cycle using remote sensing data that can potentially aid the conventional watershed analyses. By integrating spatial land surface and climate data that describe a watershed as an input dataset in a machine learning model (MLM), and in-situ streamflow discharge data for an output learning dataset, a relationship between watershed characteristics and streamflow is established. The results are validated using in-situ data and compared with results from previous conventional modeling studies. The overall performance of monthly streamflow prediction shows the land surface integrated MLM could be effectively used for streamflow prediction.

# PREDICTORS OF SOCIAL AND EMOTIONAL LEARNING IMPLEMENTATION

|            |   |
|------------|---|
| Presenter: | Lacey, Heather<br>Graduate, Psychology    |
| Mentor     | Prof. Adena Meyers                        |
| Authorship | Heather Lacey; Megan Rogers; Adena Meyers |

The development of social-emotional competencies is a critical task that may be promoted through the use of programs that teach social and emotional learning (SEL). Given the importance of these skills, efforts have been made at the federal level and at most state levels to encourage the implementation of SEL within schools. At the school level, successful implementation depends heavily on teacher-specific factors that include attitudes towards SEL, their students' emotions, and their own emotions.

Teachers' SEL implementation behaviors may be influenced by their beliefs about SEL. Teachers' comfort with, commitment to, and perceived school culture around SEL are of particular importance. Further, teachers' meta-emotive structures as they relate to their own emotions and to children's distressing emotions may provide insight regarding SEL implementation behaviors.

The current study seeks to identify predictors of quality implementation of SEL by exploring its relationship to teachers' beliefs about social emotional learning (SEL), their responses to children's negative emotions, and their relationship to their own feelings. The study will also assess teachers' emotional self-efficacy as well as their acceptance or denial of their own emotions. By investigating these teacher-specific factors and implementation behaviors, this study will link research with practice to inform better quality future implementation.

Teachers responsible for SEL implementation in their classrooms were recruited for this study. A total of  $n = 154$  Pre-K to 5th grade from various schools ( $n = 21$ ) and school districts ( $n = 11$ ) across Illinois participated in this study. Teachers completed a demographic questionnaire, the Teachers Coping with Children's Negative Emotion Scales (TCCNES; Gosney, 2006), the SEL Scale for Teachers (Brackett et al., 2012), and the Crèche Educator Emotional Style Questionnaire - Individual Emotions (CEESQ-IE; Ciucci, et al., 2015). Following the completion of these measures, teachers reported the frequency and duration of SEL implementation every two weeks through an SEL Log.

Cronbach's alphas will determine internal consistency of the items and correlations will determine the strength of the association between meta-emotion variables, SEL beliefs, and teachers' emotional style. Simple and multiple regressions will be conducted to identify predictors of teacher SEL implementation behavior.

It is expected that teachers' emotion style within the meta-emotion framework will predict SEL implementation. It is also expected that teachers' attitudes towards their own emotions will be predictive of SEL implementation. Lastly, it is expected that teachers' beliefs about SEL will be predictive of the frequency and duration of SEL implementation behaviors.



# EFFECTS OF ATTENTIONAL FOCUS COACHING CUES ON KINEMATICS AND PERFORMANCE OF INSIDE OF THE FOOT SOCCER TRAP

Presenter

Lako LoSarah, Ladule  
Graduate, Kinesiology & Recreation

Mentor

Prof. Adam Jagodinsky

Authorship

Adam Jagodinsky; Mike Torry; Pete Smith

**INTRODUCTION:** Coaches have the duty to optimize their players' performance and learning outcomes. To achieve this end, they often employ verbal cues to help players refine their technique. Different verbal cues can potentially alter the focus of attention, what the player is consciously or subconsciously thinking about when performing the technique, in suboptimal ways, leading to declines in performance. Previous research has documented this variation in performance; however, has yet to examine changes in the kinematics of the movement. **PURPOSE:** Examine kinematic changes in soccer trap performance due to different attentional focus cues. **METHODS:** 10 division 1 female soccer players participated in the study. They performed 5 trials of trapping a soccer ball launched from a pendulum under 4 different cueing conditions. Lower extremity kinematics were collected using a motion capture system. Performance scores were collected by the success of the trap according to ball position. A repeated measure ANOVA was conducted to assess the differences between condition scores and kinematics. **RESULTS:** No significant differences were found across the different conditions for any of the kinematic or performance variables. **CONCLUSION:** Although the participants indicated a perceived manipulation during the different conditions, the lack of a difference in performance and kinematics could be due to limitations in methodology. Different variables should be analyzed to determine where the differences between conditions exist and the layout of the scoring system should be altered to augment the realism of the activity. Further research is needed to properly describe the trap as well as assess the synergies of the movement.

# EFFECTS OF SOCIAL ANXIETY IN INITIAL INTERACTIONS

|            |  |
|------------|--|
| Presenter  | Landa, Nicole<br>Graduate, Psychology      |
| Mentor     | Prof. Susan Sprecher                       |
| Co-Mentor  | Prof. Jeffrey Kahn                         |
| Authorship | Nicole Landa; Susan Sprecher; Jeffrey Kahn |

For people with social anxiety, initial interactions can be anxiety provoking. This anxiety can cause self-protecting behaviors such as talking very little or having limited eye contact which can affect the outcomes of the interactions (Arkowitz, Lichtenstein, McGovern, & Hines, 1975; DePaulo, Epstein, & Steele LeMay, 1990). In this study, I will investigate how the individual difference variable of social anxiety can affect feelings of closeness, enjoyment, liking, and other interpersonal outcomes in real and hypothetical get-acquainted interactions. Two studies with different methods will be conducted for this thesis project to examine the potential effect of social anxiety on initial interactions. First, I will conduct a secondary analysis of a prior social interaction study (Sprecher, Treger, & Wondra, 2012), in which 59 pairs of strangers became acquainted through a structured self-disclosure task with the dyad members taking turns being the discloser or receiver of self-disclosure. I will extend the prior study by examining how the participants' social anxiety levels are associated with their own reactions to the interaction, as well as associated with their partner's reactions to the interaction (thus considering both actor and partner effects). In a second study, I will obtain a separate sample of participants and assess how their social anxiety is associated with their expectations of how they would behave and react in a get-acquainted situation that mirrors the Sprecher et al. (2012) experiment. This research will add to the body of literature about how socially anxious individuals perceive themselves while meeting new people, as well as how others perceive them. This research is ongoing, but will be completed by summer 2019.

Keywords: Social anxiety, initial interactions, closeness, enjoyment, liking

# DESIGNING THERMOSWITCHABLE POLYMER-GOLD COMPOSITES AS A REVERSIBLE SIGNAL ENHANCING SUBSTRATE

Presenter

Lartey, Jemima

Graduate, Chemistry

Mentor

Prof. Jun-Hyun Kim

Authorship

Pascal Eyimegwu; John Harms; Stephanie Swan; Wongi Jang;  
Jun-Hyun Kim

Multiple gold nanoparticles embedded within poly (N-isopropyl acrylamide) provide an excellent platform for molecular sensing due to their unique physical and chemical properties. In an attempt to investigate these properties, it was realized that the polymer exhibits a tunable local critical solution temperature behavior. The thermoresponsive properties of polymer-gold composite were then evaluated in solution using ultraviolet-visible absorption spectroscopy, surface enhanced Raman spectroscopy and scanning electron microscopy. The reversibility of aggregation and re-dispersion through multiple cycles of heating and cooling was established.

# SYNTHESIS AND METALATION OF INTERNALLY ALKYLATED PORPHYRINOIDS

|            |                                       |
|------------|---------------------------------------|
| Presenter  | Latham, Alissa<br>Graduate, Chemistry |
| Mentor     | Prof. Timothy Lash                    |
| Authorship | Alissa Latham; Timothy Lash           |

Alkylation of benzocarbaporphyrin 1 afforded asymmetrical N-alkyl derivatives 2, which underwent metalation with palladium(II) acetate to afford palladium(II) complexes where the internal alkyl group had migrated from the 22- to the 21-position. To investigate the mechanism behind the migration, 23-methylbenzocarbaporphyrin 3 was synthesized from an N-methyltripyrane and an indene dialdehyde. Carbaporphyrin 3 was metalated with palladium (II) acetate and it was found that alkyl group migration still occurred, albeit at a slower rate, to give a mixture of 23-methyl and 21-methyl palladium (II) complexes. Methylcarbaporphyrin 3 also underwent a rearrangement upon metalation with  $[\text{Rh}(\text{CO})_2\text{Cl}]_2$  to give a methylene bridged derivative 4. By utilizing MacDonal-type '3+1' condensations, the N-methyl tripyrane was reacted with 5-formylsalicylaldehyde, 3-hydroxy-2,6- pyridinedicarbaldehyde, 2,5-thiophene and furan dialdehydes, and 5-methyl-2,4-pyrroledicarbaldehyde to afford a series of N- methylated porphyrins 5-8. Metalation of these internally alkylated porphyrinoids is currently under investigation.

# WHAT RESPONSE TO INTERVENTION (RTI) SERVICES ARE ENGLISH LANGUAGE LEARNER (ELL) STUDENTS RECEIVING COMPARED TO NATIVE ENGLISH-SPEAKING STUDENTS?

Presenter

Lopez, Diana

Graduate, Social Work

Mentor

Prof. Kathryn Conley Wehrmann

Author

Diana Lopez

The United States (U.S) is a country of diverse cultures, ethnicities, religions, and languages. Amongst this diversity includes English Language Learners (ELLs). English Language Learners (ELLs) are students who are learning the English language due to a non- English-speaking upbringing. ELL students are a significant part of public-school population. According to the National Education Association (n.d), ELLs are the fastest growing subgroup in U.S public schools. In 2015, the number of ELL students doubled to about 5 million and it is predicted that by 2025, one in every four students will be an ELL (National Education Association, n.d)

The purpose of this program evaluation is to see what Response to Intervention (RTI) services ELL students are receiving compared to Native English-speaking students based on existing data from a bilingual school, Rosewood Elementary (Pseudonym), located in central Illinois. The study design is a descriptive study using quantitative methodology. The sampling method is purposive (nonprobability) because the researcher will be selecting data based on ELLs and Native English-speaking students receiving RTI services. RTI interventionists will be extracting the data for the researcher to maintain student confidentiality. The researcher will provide the RTI interventionist with a data chart. The interventionist will document what services they provide to either an ELL or Native English-speaking student by noting it in the appropriate place in the data chart. After collecting the charts from each interventionist, the researcher will then analyze the data. SPSS will be used by the researcher to generate descriptive statistics.

# EXAMINING THE ASSOCIATIONS AMONG MOTHER-CHILD ATTACHMENT RELATIONSHIP QUALITIES, SELF-REGULATION, AND PEER ACCEPTANCE DURING THE PRESCHOOL YEARS

|            |  |
|------------|--|
| Presenter  | Lucas-Nihei, Jessica<br>Graduate, Psychology |
| Mentor     | Prof. Alycia Hund                            |
| Authorship | Alycia Hund                                  |

Peer acceptance represents the degree to which a child is well-liked by peers, and it is a crucial component of early childhood years (Ladd & Sechler, 2013). A child who is accepted by peers is sought out as a preferred playmate, is well-liked by many of peers, and can be observed playing with many peers on a frequent basis. The preschool years are one of the earliest opportunities for young children to interact with similar-aged peers in a semi-structured setting through play, which provides opportunities to acquire and build upon a wide range of emerging social skills (Coplan & Arbeau, 2009).

One predictor of peer acceptance is parent-child attachment, where the security experiences from the attachment foster the growth of children's social competence to begin forming relationships with other children (Raikes, Virmani, Thompson, & Hatton, 2013). Two qualities of interest were closeness and conflict experienced within mother-child attachment. Closeness includes warmth and affection and conflict includes negativity (Driscoll & Pianta, 2011). Children's self-regulation, or the processes enabling children to manage their behavior to better adapt to their environment, is another important predictor of peer (Liew, 2012). Young children with strong self-regulatory skills are more likely to exhibit effective and socially appropriate behavior in the classroom, such as engaging in social play, following classroom rules, and transitioning between activities (Ponitz et al., 2008). These behaviors are important for successful peer interactions.

The goal of this project was to examine whether mother-child attachment relationship qualities, preschoolers' self-regulation, and preschoolers' peer acceptance are significantly related to one another. To date, 90 preschool-age children from 31 early childhood classrooms, 90 mothers/maternal guardians, and 29 lead classroom teachers have participated. Maternal guardians were asked to complete two rating scales measuring the conflict and closeness experienced within the attachment relationship. Preschool children completed four self-regulation tasks. Lead classroom teachers completed two rating scales rating the children participants' self-regulation and perceived peer acceptance.

Data collection is ongoing. Once our target sample size is reached, three mediation models will be tested via path analysis to describe how preschoolers' self-regulation can account for the association between mother-child attachment relationships and preschoolers' peer acceptance. It is expected that the overall mediation model will serve a good fit, where preschoolers' self-regulation mediates the association between mother-child attachment and preschoolers' peer acceptance. It is also expected that older preschoolers and girls will demonstrate stronger self-regulation compared to younger preschoolers and boys, respectively.

# INTERACTIONS BETWEEN THE COG COMPLEX AND ATP7A IN NEURODEGENERATIVE DISEASE

|            |  |
|------------|--|
| Presenter  | Margewich, Lindsey<br>Undergraduate, Biological Sciences |
| Mentor     | Prof. Alysia Mortimer                                    |
| Authorship | Lindsey Margewich; Alysia Mortimer                       |

Menkes disease is an X-linked neurodegenerative disease related to the improper distribution of copper. This disease can result from mutations in the ATP7A copper transporter gene. In the Golgi apparatus, ATP7A imports copper used in the assembly of cuproenzymes and if copper levels are too high, ATP7A localizes to the cell membrane and functions to pump copper out of the cell. Because of this, when ATP7A is not functioning properly, copper cannot be distributed to the brain and other tissues in the body. Other proteins have been found to interact with ATP7A for the regulation of copper with one being the Conserved Oligomeric Golgi (COG) Complex. We are looking at how the COG complex interacts with ATP7A's ability to transport copper. For this study, we focus on COG1, COG5, and COG8, three members of the COG complex. We inhibited each member of the COG complex in dopaminergic neurons and assayed for copper sensitivity. We found that inhibition of the COG complex leads to decreased sensitivity to copper exposure. In addition, we found that the COG complex interacts with ATP7A to regulate copper sensitivity.

# COLD-INDUCIBLE RNA-BINDING PROTEIN MAY REGULATE GONADAL DEVELOPMENT IN THE RED-EARED SLIDER TURTLE

|            |  |
|------------|--|
| Presenter  | Marroquin-Flores, Rosario<br>Graduate, Biological Sciences           |
| Mentor     | Prof. Rachel Bowden  |
| Co-Mentor  | Prof. Ryan Paitz   |
| Authorship | Rosario Marroquin-Flores; Nathan Mortimer; Ryan Paitz; Rachel Bowden |

Temperature-responsive genes, such as those coding for heat shock proteins, play a vital role in embryogenesis. Cold-inducible RNA-binding protein (Cirp) is a heat shock protein present in the gonadal tissues of multiple taxa with a potential regulatory role in the sex-determining pathway. The red-eared slider turtle (*Trachemys scripta elegans*) exhibits temperature-dependent sex determination (TSD), where thermal cues trigger gonadal differentiation during development. In *T. s. elegans*, Cirp is up-regulated prior to estrogen-inducing transcripts at female-producing temperatures. Intron retention has been proposed as a regulatory mechanism for sex-specific development, and RNA-binding proteins can regulate the retention of introns. As Cirp is an RNA-binding protein localized in developing gonads, we hypothesize that Cirp plays a regulatory role in gonadogenesis by impacting the stability of target transcripts via intron retention. *T. s. elegans* eggs were incubated under fluctuating temperature treatments and either held under conditions that should produce males, or given a simulated heatwave to induce female development. Gonads from embryos were dissected for immunoprecipitation and RNA-seq. Sequenced RNA product will be aligned to an internal transcriptome developed from published raw reads to identify the target transcripts. Target transcripts will be translated and aligned to the painted turtle (*Chrysemys picta*) proteome to identify alignment gaps that correspond to retained introns. Our approach will help us understand how Cirp responds to fluctuating temperature treatments, and how it may regulate the nuclear expression of reproductive genes.



# DEFENSIVE INTERACTIONS BETWEEN PARASITE CUSCUTA PENTAGONA AND ITS HOST

|            |  |
|------------|--|
| Presenter  | Martin, Timothy<br>Graduate, Biological Sciences |
| Mentor     | Prof. Victoria Borowicz                          |
| Authorship | Timothy Martin; Victoria Borowicz                |

Plants must respond to stimuli to grow, reproduce, and protect against enemies. To defend themselves, plants produce chemicals that reduce the likelihood of attack. Because they defend themselves and communicate chemically, plants have been postulated to communicate to one another when they come under attack by herbivores. This communication may serve to prime defense responses in undamaged plants near neighbors under attack.

*Cuscuta* species are non-photosynthetic, parasitic vines that rely entirely on hosts for nutrients. Upon contact with hosts, *Cuscuta* develop haustoria, which are specialized organs that penetrate the vascular tissue of the host and through which the parasite absorbs nutrients and water. In addition to sugars and nutritionally relevant compounds, other molecules can move bidirectionally between the host plant and *Cuscuta* via haustoria. Because they may be linked simultaneously to multiple hosts, *Cuscuta* may be able to transfer defense signaling hormones among hosts. Furthermore, the biosynthesis pathways of some plant defense molecules take place partially in chloroplasts, an organelle not found in *Cuscuta*. My research will test the hypotheses that (1) *Cuscuta* use defense hormones synthesized in their hosts to develop their own defense, and (2) *Cuscuta* serve as conduits for transfer of defense signals between hosts.

The first step was to test the ability of tobacco to produce a defensive response to *Cuscuta pentagona* infestation and to determine the time-course of the response. I did this by infesting young tobacco plants with single *Cuscuta* shoot tips for intervals of 24 hours, ranging from 24 hours to 120 hours. When a tobacco plant was approximately 8 weeks old, I placed a 5 cm *Cuscuta* clipping at the base of the tobacco. The experiment commenced when the *Cuscuta* was observed to have one complete rotation around the plant and at least one visible haustorial connection. Each treatment of 24, 48, 72, 96, and 120 hours was replicated five times. Upon reaching the end time, the *Cuscuta* vine was removed from the tobacco plant, the first leaf near above the attachment point was cut from the infested leaf, and an analogous leaf was cut from an uninfested, similarly-aged control plant. The vine and leaves were weighed for wet weight, number of haustoria was counted from the vine, and salicylic acid content was determined via a ferric chloride assay. Biochemical assays are currently underway.

# AQUIFER CHARACTERISTICS AND GROUNDWATER SUSTAINABILITY OF DEEP BEDROCK AQUIFER SYSTEM

|            |   |
|------------|---|
| Presenter  | Martinez, Luis  |
| Mentor     | Graduate, Geography, Geology, and the Environment         |
| Authorship | Prof. Wondwosen Seyoum<br>Luis Martinez; Wondwosen Seyoum |

As populations continue to grow and climate change makes precipitation events less predictable, groundwater becomes an increasingly important freshwater resource. Traditionally the city of Bloomington, IL has used Lakes Evergreen and Bloomington as their primary source of water, but threats of drought and pollution necessitated the need for alternate sources of water. The city has drilled two high capacity wells into the St. Peter Sandstone to meet these growing water demands. The St. Peter Aquifer, is a mostly confined aquifer, receiving negligible amounts of modern recharge experiencing high drops in water levels due to overexploitation in parts of northern Illinois. The objective of this study is to characterize the St. Peter Aquifer and assess its potential as a water resource by building a geologic and groundwater model. This study will model changes in the St. Peter's potentiometric surface to estimate sustainable yield with projected increases in pumping. I hypothesize that existing fast depletion of the St. Peter occurs due to lower-than-expected aquifer parameters of the aquifer. Further, current pumping of groundwater from the St. Peter, plus the new wells could compromise long-term sustainability. This study will be using ArcGIS in conjunction with MODFLOW build our models. Geological data from 395 wells were collected from the Illinois State Geological Survey (ISGS) and interpolated in ArcGIS to build the geologic model. Boundaries for our model are based on geologic features and data availability of the St. Peter, collected from the ISGS. Once the geologic model was interpolated in ArcGIS, it was input into MODFLOW to build the conceptual model. Our model domain contains 46 municipal wells to simulate pumping from the St. Peter. Water level and pumping data from the Illinois State Water Survey (ISWS) are used to calibrate the model. The geologic model showed that the St. Peter Aquifer is dipping southward, increasing in depth below the surface increasing pumping cost. There are also fewer wells as you move south decreasing demand around Bloomington. Groundwater simulation models like the one developed in this study have emerged as powerful tools for addressing complex real world issues concerning impacts of extensive groundwater development. The model has been able to mimic real world observations in Northern Illinois with decreased head values in the areas experiencing overdraw.

# SUBURBAN PONDS REDUCE NITRATE LOSS FROM LAWNS TO STREAMS

|            |  |
|------------|--|
| Presenter  | McGinnis, Laurel<br>Graduate, Biological Sciences                          |
| Mentor     | Prof. Bill Perry   |
| Authorship | Laurel McGinnis; Bill Perry; Sarah Cirullo; Carlos Vasquez; Victoria Heath |

Loss of nitrogen and phosphorus fertilizer from Midwestern watersheds, e.g., agricultural fields and lawns, is a major contributor to the dead zone in the Gulf of Mexico. The dead zone is an area the size of the state of New Jersey in the Gulf of Mexico that no longer supports life near the bottom. Loss of nitrogen from Illinois and other Midwestern states is a major cause of the dead zone. Excess nitrates in water is also a problem in municipal water supplies especially for infants under six months of age. Although we have identified the problem, it is unclear how to reduce the loss of nitrate to streams that drain to the Gulf while maintaining green lawns and productive agricultural fields. We examined the potential of suburban water retention ponds to reduce nitrate loading to streams by examining the loads of nitrate entering and leaving the pond. We sampled the inflow and outflow of Tipton Lakes weekly for 3 months to estimate the change in nitrate and phosphate loads as they moved through the pond. We also examined the ability of the ponds to reduce sediment loading to the stream. The ponds at Tipton Lakes reduced nitrate loads by approximately 50%. These ponds are an effective tool to reduce nitrate loss from suburban areas. The inclusion of these systems in urban planning has the potential to significantly reduce nitrate loads in streams draining suburban systems while also increasing areas for recreation and wildlife.

# SCIENCE SELF-EFFICACY IN MIDDLE SCHOOL

Presenter

McNulty, Brittany  
Graduate, Teaching and Learning

Mentor

Prof. Allison Antink-Meyer

Research has shown that elementary and middle school teachers do not always feel prepared to teach science. Teachers with low self-efficacy in science teaching tend to rely more on books and use teaching strategies for maintaining control of the flow of knowledge in the classroom, rather than those that would engage students in science. A teacher with higher self-efficacy is more likely to incorporate inquiry-based science in the education of their students.

While inquiry-based education can be challenging, students find benefit from the cooperative learning environment. Studies have shown students becoming more confident in voicing their own opinions, more involved in in-depth classroom discussions, and better able to recall information because they have related it to their own experiences.

Students who have a high self-efficacy and a strong belief that they can succeed are more likely to work harder and persevere in the face of obstacles. Self-efficacy is a strong predictor of academic achievement and success. If a student lacks self-efficacy, they need more positive experiences to become efficacious. Inquiry-based science education has the possibility of providing challenging but positive experiences for students through collaborative learning. Unfortunately, students moving into middle and high school have a propensity to lose interest in science.

Through mixed-methods research, my study investigated students' self-efficacy over time with context given to the environment in which they learned. I worked with two middle school teachers and their students (7th and 8th grade) at separate schools. Exploration of materials from both teachers showed different teaching styles resulting in two different learning environments. Analysis of student surveys enabled comparisons across time, gender, grade level, and school. Results showed that differences between the two schools of students did exist. Other differences and similarities were also explored.

Keywords:

Self-efficacy - A judgment of one's own capabilities to perform actions that they believe could lead to desired results.

Inquiry-based science - Students are actively engaged using both science processes and critical thinking skills as they search for answers.

# EXTENT AND DETERMINANTS OF FINANCIAL INCLUSION AMONG AGRICULTURAL PRODUCERS IN GHANA

Presenter

Mohammed, Fatima  
Graduate, Agriculture

Mentor

Prof. Michael Barrowclough

Financial inclusion has become a domestic policy issue of increased importance and concern particularly in developing countries, largely due to its potential to spur growth and improve incomes. Financial inclusion is defined as the process of ensuring the ease of access, availability, and usage of a formal financial system for all members of an economy (Sarma, 2008). In developing countries, agricultural producers have generally been excluded from formal financial systems such as savings, credit and insurance (Morvant-roux, 2008). The nature of agricultural operations makes access and usage of such financial systems essential; impacting agricultural productivity, food security and poverty reduction. Using the Ghana Living Standards Survey (GLSS7), this study seeks to identify the extent of financial inclusion among agricultural producers in Ghana and also determine the individual and farm-level factors affecting financial inclusion. Measuring financial inclusion is important for both formulating policy priorities and allocating scarce government and donor resources. Hence the results of this study may assist policymakers in designing policy schemes aimed at improving the usage of financial services among agricultural producers. Consequently, this may improve the livelihood of farmers and contribute to Ghana's overall economic development.

# A COMPARISON OF WAIST-TO-HEIGHT RATIO, BMI, AND WAIST-TO-HIP RATIO

Presenter

Moore, Ayunna Undergraduate, Kinesiology & Recreation

Mentor

Prof. David Thomas

Authorship

Ayunna Moore; David Q. Thomas

Body composition is a measure of the proportion of fat-free versus fat mass and is an important component of general health and wellness. As obesity rates continue to become more prevalent, more non-invasive methods for measuring body composition are needed to determine one's risk of disease. Purpose: To compare waist-to-height ratio (WTHT) to body mass index (BMI) and waist to hip ratio (WHR) for determining body composition. Methods: Height was measured in centimeters using a wall mounted stadiometer. Mass was measured in kilograms using a clinical scale. Waist and hip circumferences were measured in centimeters using a Gullick tape measure. Waist to height ratio was calculated by dividing the participant's waist circumference by their height. BMI was calculated by dividing the participant's mass by their height squared. Waist to hip ratio was calculated by dividing their waist circumference by their hip circumference. Results: Twenty-two volunteers (8 male; 14 female) with an average age of 20.8 years (+ 1.04) participated in the study. The average height of the subjects was 170 cm (+ 0.11). Mean BMI was 23.65 (+ 3.18). Mean measurements for waist and hip were 76.2 cm (+ 8.07) and 99.25 cm (+ 7.78), respectively. The correlation between BMI and waist to height ratio was  $r = 0.78$  which reflects a moderately strong correlation. The correlation between waist to hip ratio and waist to height ratio was  $r = 0.59$ , or a moderate correlation. Conclusion: Waist to height ratio was related to BMI. In this regard, WTHT ratio may be a substitute for BMI as a screening method for overweight and obesity.

# A DESCRIPTION OF THE NON-TRADITIONAL USE OF THE ACTIGRAPH TO RECORD LATERAL NEUROMOTOR MOVEMENTS OF INFANTS DURING WAKEFULNESS.

|            |                               |
|------------|-------------------------------|
| Presenter: | Mordan, Leanne                |
|            | Undergraduate, Psychology     |
| Mentor     | Prof. Julie Campbell          |
| Authorship | Leanne Mordan; Julie Campbell |

Supine Head Orientation Preference (SHOP) is the tendency to turn one's head toward either side of the body, and hold the head in that position for a significant period of time. Actigraphs are wearable devices, which are able to record precise movements of the body. Actigraphs have been used in infant sleep studies to record the frequency of limb movements within a given time period (Atun-Einy, Tonetti, Boreggiani, Natale, & Scher, 2017), however, studies attempting to estimate lateral preference tend to rely on behavioral measures recorded by video. This project investigates the relationship between actigraph recordings of arm movements during wake periods and SHOP from 4 to 16 weeks postnatal. Actigraph data was useful for detecting a difference in the number of lateral movements performed between the left and right arm at 4, 8, and 12 weeks of age.

While seated in a semi- reclined seat, actigraph recordings of six infants' arm movements were recorded for 10 minutes at 4, 8, 12, and 16 weeks of age. No interaction occurred during actigraph recordings. For the SHOP procedure, infants were placed inside of a small tent, in order to block overhead distractions. Infants' heads were held at midline for 60 seconds, and then movements were recorded for 60 seconds after, during which infants were allowed to move freely. This procedure was repeated 4 times at each visit (4 and 8 weeks). Researchers coded head movements when the chin passed the nipple line.

Z-scores for SHOP and arm movements were determined using the frequency of right and left SHOP and arm movements. The difference score between the left and right arm movement was also calculated. The correlation between SHOP and the difference scores between left and right arm actigraph frequency was not significant. However, Univariate Analysis of Variance results show that there is a significant difference in the number of lateral movements performed between 4, 8, and 12 weeks, such that infants perform significantly more movements at 12 weeks ( $M = 475.75$ ) than at 4 weeks ( $M = 365$ ) or 8 weeks ( $M = 380.8$ ).

# BULLYING PREVENTION PROGRAM EVALUATION

|           |  |
|-----------|--|
| Presenter | Murphy, Michael<br>Graduate, Social Work |
| Mentor    | Prof. Kate Sheridan                      |

This research examines the effectiveness of an anti-bullying curriculum (Second Step) in increasing knowledge and skills about bullying among K-5 students, from the perspective of their classroom teachers. The study also examines the extent to which teachers feel confident in implementing the strategies of Second Step. This is the second year that Plainfield Elementary has implemented this particular anti-bullying curriculum, although it has had anti-bullying curriculum as part of the regular classroom curriculum for K-5 going back several years. Findings from this study will inform administrators and teachers about how the curriculum is being implemented as well as the effectiveness of the curriculum in effecting change in student behavior.

Participants are K-5 teachers who are adults aged 18 years of age or older. Sources of data include pre-posttest surveys administered prior to and preceding each of 4 Second Step modules. Each grade level (K-5) is taught 4 Second Step sessions throughout the school year. The content of the curriculum is the same for K-3 students, and this has some overlap with the Grade 4-5 curriculum (and some differences). The pre and posttests administered to the teachers reflect the content of the 4 modules that the students in their classrooms receive, depending on grade level.



# PERCEIVED OSTRACISM AND POSTTRAUMATIC STRESS SYMPTOMS AMONG VETERANS

|            |   |
|------------|---|
| Presenter  | Myers, Julie  |
|            | Undergraduate, Psychology                                   |
| Mentor     | Prof. Eric Wesselmann                                       |
| Co-Mentor  | Prof. Leandra Parris  |
| Authorship | Julie Myers; Eric Wesselmann; Leandra Parris; Mark Swerdlik |

Posttraumatic stress - negative psychological experiences as a result of the stressors encountered during combat - can hinder military veterans' reintegration into society and cause various mental health problems (Kaylor, King, & King, 1987). Combat veterans need quality social relationships to facilitate reintegration and to cope with posttraumatic stress and related mental health problems (Harvey et al., 2011; Smith et al., 2013); discrimination or other forms of interpersonal rejection can exacerbate these veterans' problems (Dreazen, 2014; Edlund, Fortney, Reaves, Pyne, & Mittal, 2008). One type of threat to social relationships - ostracism (i.e., being ignored and excluded; Williams, 2009) - is a painful and psychologically distressing experience that may be one factor that contributes to the problems of veterans who are dealing with posttraumatic stress (McGraw, 2016; Wesselmann et al., 2018).

People do not always have to be directly ignored to feel ostracized; sometimes unintentional interpersonal slights (e.g., hurtful comments, checking one's cellphone during a conversation) can make people feel ostracized in the midst of a social interaction (Wesselmann, Michels, & Slaughter, 2019). Research suggests that one reason for this may be that these slights make people feel as if they are not valued in that relationship. Another way that people may be made to feel less valued in their relationship is when they receive poor social support - support efforts that may be well-meaning but do not match what the recipient wants or perceives as helpful (Burlison, 2003; Holstom et al., 2005).

We investigated the potential connections between social support and feelings of ostracism and psychological need satisfaction (e.g., feelings of belonging, self-esteem, control, and meaningful existence; Williams, 2009) among a sample of previously deployed Illinois National Guard veterans (N = 80). Participants were randomly assigned to recall an autobiographical event: 1) the last time they had breakfast (control condition), 2) a time in which they received helpful social support from a civilian, or 3) a time in which they received unhelpful social support from a civilian. Participants were asked to think about their assigned memory and describe it in an open-ended text box. After completing the writing portion, they then completed measures related to feelings of ostracism based on how they recalled feeling during the event they described.

Quantitative results suggest that participants who recalled an unhelpful support interaction recalled feeling more ostracized and lower basic need satisfaction than participants in the other two conditions. Further, some participants in the unhelpful condition explicitly used words such as "lonely" or "ignored" before they completed any of the relevant ostracism measures, suggesting these descriptors occurred to them organically. We are currently conducting qualitative analyses on the written responses to identify specific themes in both helpful and unhelpful social support interactions.

# CHLORIDE SIGNATURE AND TRANSPORT IN AN URBAN-AGRICULTURAL STREAM

Presenter

Oberhelman, Andrew

Graduate, Geography, Geology, and the Environment

Mentor

Prof. Eric Peterson

Manual and high frequency sampling of a low order urban-agricultural stream and surrounding field tiles located in central Illinois was conducted to investigate the importance of stormflow to Cl<sup>-</sup> transport and to explore potential differences in the signature of Cl<sup>-</sup> originating from an urban source as compared to an agricultural source. Weekly sample collection at three points along the stream began in February 2018 and will conclude in February 2019; event sampling during storms supplemented the weekly sampling data. Anion data from weekly samples indicate that waters are impacted by road salt in the winter (Feb-Mar) where Cl<sup>-</sup> concentrations range from 100-350 mg/l while Cl<sup>-</sup> levels decline to 30-120 mg/l in the spring (Mar-Jun) and summer (Jun-Aug). Waters from the urban headwaters of the stream exhibited a higher Cl<sup>-</sup> concentration (10-60 mg/l) except during the month of February. High frequency storm samples illustrate a more complex Cl<sup>-</sup> dynamic during the sample interval. Cl<sup>-</sup> concentrations spike during storms in late March and mid-April (>200 and 100 mg/l respectively) after the first storm flush and weather conditions that warrant salt application. The spikes may represent continued flushing of Cl<sup>-</sup> through the system. Cl<sup>-</sup>/NO<sub>3</sub>-N ratios along with Cl<sup>-</sup> /Na<sup>+</sup> ratios close to 1 support road salt as the source of Cl<sup>-</sup> in this stream. Agricultural waters from three different tiles exhibit a much more variable Cl<sup>-</sup>/NO<sub>3</sub>-N ratio. Waters from one sampled tile plots along the vector that indicates the expected influence of nitrogen and anhydrous ammonia fertilizers, while two other tiles plot along the animal waste and septic effluent vector with elevated Cl<sup>-</sup> concentrations. Variable chloride concentrations observed in agricultural input to this stream represent a potential secondary chloride source that could contribute to salinization in agricultural or multi-land use watersheds.

# THE STRESS RESPONSE GENE P38 MAPK REGULATES COLLAGEN IV IN DROSOPHILA

|            |  |
|------------|--|
| Presenter  | Oceguera-Perez, Briseida                 |
|            | Graduate, Biological Sciences            |
| Mentor     | Prof. Alysia Vrailas-Mortimer            |
| Authorship | Basheer Becerra; Briseida Oceguera-Perez |

Aging is an expected and normal process across living organisms. It is characterized as a loss of stress resistance, degeneration of tissues, and decline in motor function that happens gradually across the lifespan. With age, an organism becomes susceptible to diseases that are exacerbated by the progression of time (e.g. neurodegenerative and dystrophic conditions) and unlike aging, they are not a normal aspect of lifespan. Discerning the difference between normal and aberrant aging states will give insight into the mechanisms behind the progressive dysfunction shared among living organisms. Previous work in our lab has shown that the aging gene p38 MAPK in *Drosophila melanogaster* plays a significant role in the aging process through its downstream effects on nuclear and cytoplasmic targets, specifically through the regulation of protein turnover and response to oxidative stress. Through a proteomics analysis of p38Kb mutants across different ages, we found that levels of the extracellular matrix protein collagen IV varied significantly with p38Kb manipulation. We will explore the nature of this relationship and determine if loss of p38Kb results in aggregation of collagen IV, a loss of muscle structure, or impairment of collagen IV trafficking across the plasma membrane. Additionally, we will determine if loss of collagen IV results in increased oxidative stress and a decrease in lifespan.

# CAPTURE ZONE ANALYSIS OF A WELLFIELD TO ASSESS CONTAMINANT TRANSPORT

|            |   |
|------------|---|
| Presenter  | Oware, Prince                                     |
|            | Graduate, Geography, Geology, and the Environment |
| Mentor     | Prof. Wondwosen Seyoum                            |
| Authorship | Wondwosen Seyoum                                  |

Deep groundwater aquifers provide alternative sources of usable fresh water in many parts of the globe. In Illinois, deep bedrock aquifers serve as water supply for several municipalities. However, some of these deep aquifers are vulnerable to contamination, for example, due to an increase in salinity, radioactive compounds, oil and gases, and other human activities. This project seeks to understand the flow direction and capture zone of wellfield in Northern Illinois and assess radium transport using numerical flow modeling. One of the distinct stratigraphic variation in areas having radium levels exceeding the maximum contaminant level (MCL) and other areas is the presence of the Maquoketa shale, which acts as a confining unit for the Cambrian Ordovician aquifer system in most of Northern Illinois. Concentration of naturally occurring Ra exceeding the MCL was detected in one of the public wells within an unconfined region. Development of anoxic condition, increased mineralization, and high residence time could lead to a reduction in adsorption capacity of the solid phase in the aquifer. Groundwater flow model was developed to better understand the flow system for the unconfined region having high Ra level to assess whether, higher pumping from neighboring areas having higher Ra levels already recorded is resulting in reversal of contaminated water into the unconfined regions not having the necessary geochemical conditions for the desorption of Ra within the aquifer matrix. Nearly 270 well log data across the area were used to build the 3D geologic and flow model. Steady state conditions for the model together with withdrawal rates is simulated at different time to assess the flow patterns of the area and the capture zone of the well. With the presence of Sandwich fault (which serves as a barrier flow boundary) together with increased pumping from neighboring areas allows for the creation of asymmetric cone of depression which extends into areas having already recorded higher Ra levels. The result from this study can be applied in water management application toward protecting deep groundwater aquifers and also show the need to better characterize and protect deep groundwater aquifers.

# STRUCTURE/REACTIVITY STUDIES OF O-METHYL CARBINOLAMIDES IN WATER AS FUNCTION OF PH

Presenter

Park, YeJun

Graduate, Chemistry

Mentor

Prof. Richard Nagorski

Author

Evan Garrett; Parker Johnston

Carbinolamides are formed by the reaction of an amide and an aldehyde/ketone with an accompanying proton shift. Interest in their chemistry has been fueled by their intermediacy in the enzyme catalyzed synthesis of  $\alpha$ -amidated peptides and in many other biological venues. Mechanistic studies of the aqueous reaction of these compounds have produced an interesting spectrum of reactivity, as well as some surprises. More recently an increasing number of O-alkylated carbinolamides have been isolated that have interesting biological function. The methods by which these compounds accomplish their biological function is unknown and this is, in part, due to a complete lack of understanding as to the mechanisms by which these compounds react in solution. The purpose of the work presented here was to synthesize a number of O-methylated carbinolamide derivatives of benzamide, and study their breakdown in water as a function of pH. A variety of electron donating and electron withdrawing substituted N-( $\alpha$ -methoxybenzyl) amides were studied, and provided a means of determining the effect of electron demand on the mechanism of breakdown of these carbinolamide derivatives. The acid-catalyzed rate constants for the carbinolamide derivatives will be discussed, along with two kinetically viable mechanisms of breakdown.

# EXPLORING THE EFFECTS OF EVENT-BASED AND TIME-BASED PROSPECTIVE MEMORY

|            |                           |
|------------|---------------------------|
| Presenter  | Perez, Alexis             |
|            | Undergraduate, Psychology |
| Mentor     | Prof. Dawn McBride        |
| Authorship | Alexis Perez              |

Prospective memory (PM) can be described as the ability to remember to complete a future task. PM tasks can be event-based (respond when an event occurs) or time-based (respond at a specific time). The current study compared these two types of PM tasks. Students from Illinois State University participated in return for class credit. Participants were asked to complete a prospective memory task embedded in an ongoing task. We compared event- and time-based prospective memory under focal (similar cues across ongoing and PM tasks) and non-focal (different cues across ongoing and PM tasks) conditions. An analysis of both category-based prospective memory and time-based prospective memory will give insight to cognitive processes in the completion of these types of intended tasks. We expect higher performance for event-based PM overall and higher performance with focal than non-focal tasks, showing that the overlap in cues aids performance.

# THE EFFECTS OF A PERSONALIZED EXERCISE PROGRAM BASED ON FUNCTIONAL MOVEMENT SCORES IN COLLEGIATE SWIMMERS

Presenter

Perkins, Melissa

Graduate, Kinesiology & Recreation

Mentor

Prof. Noelle Selkow

Context: Limited evidence is available focusing on the Functional Movement Screen (FMS) in the swimming population as well as the effects of training programs on scores over a given time period. Objective: To determine if an individualized corrective exercise program will improve scores over an eight-week period when compared to a control season. Design: Retrospective non-randomized crossover Setting: Athletic training facility (FMS) Patients: Nineteen female collegiate swimmers (mean height = 65.61 in +/- 1.88, mean weight = 145.89 lbs +/- 13.86) Interventions: Two four-week individualized corrective exercise programs generated by FMS Pro360 based on FMS results Main Outcome Measure: FMS scores Results: There were no differences between Fall 17-Spring 18, Fall 17-Fall 18 baseline, Fall 17-Fall 18 week 8, Fall 18 baseline -Fall 18 week 4, and Fall 18 baseline-Fall 18 week 8 ( $p > .101$ ). Seven of 19 (36.7%) swimmers improved scores after 4 weeks of the intervention. Twelve of 19 swimmers (63.2%) improved between 4-8 weeks, while 11 of 19 (57.9%) swimmers improved over the entire 8 weeks from baseline. Conclusions: FMS scores are not shown to improve following a personalized exercise program when completed by swimmers in season. However, although it was not statistically significant it may be clinically relevant that 57.9% of participants improved over the eight weeks.

# IS SINGLEHOOD FEARED OR DESIRED? DIFFERENCES IN ATTITUDES ON PROSPECTIVE SINGLEHOOD BASED ON AGE AND SEX

Presenter

Perry, Laine

Undergraduate, Sociology/Anthropology

Mentor

Prof. Susan Sprecher

In singlehood research, a recent construct has been introduced-fear of remaining single. The 'fear of being single' is defined as having "concern, anxiety, or distress regarding the current or prospective experience of being without a romantic partner," (Spielmann, 2013: p. 1050). Spielmann et al. developed a 7-item scale to measure this fear of being single to gain a better understanding of the fear's impact on relationship decisions such as the likelihood of settling for less in relationships. It includes items such as "It scares me to think that there might not be anyone out there for me," and "If I end up alone in life, I will probably feel like there is something wrong with me." The results from Spielmann et al.'s (2013) study suggested that those who possessed a greater fear of being single were more likely to settle for less attractive and less responsive potential dating partners. Additionally, older participants scored higher than younger participants on the scale, indicating that older individuals have a greater fear of being single. Other researchers who utilized this scale explored differences in attitudes towards the fear of being single based on gender, age, and relationship status, as well as its impact on loneliness and desire for ex-partners (Adamczyk 2017; Spielmann & Impett, 2015). Spielmann and Impett's (2015) study found that those who scored higher on the scale also maintained a higher emotional attachment to their ex-partners. Adamczyk (2017) used the scale as a mediator and found that women had a greater fear of being single, and singles who scored higher experienced greater romantic loneliness.

For this research, I am engaging in secondary data analysis of a large data set of single (unpartnered) adults, ranging in age from 18 to 40 (see Sprecher et al., 2018) who completed the Fear of Being Single scale and an ad-hoc scale on desire to remain single, as part of a larger survey on their status of being single. Our sample (N=731) consisted of students at a Midwest university, participants obtained through snowball samples, and an mTurk sample. Our hypotheses predicted that older participants are more likely to fear being single than younger participants, women are more likely than men to fear being single, and men are more likely than women to desire remaining single. Our results indicate a negative correlation between age and fear of being single. Other findings will be presented in the poster.



# PHYSICAL RESTRAINTS AND SECLUSION IN SPECIAL EDUCATION

Presenter

Peterson, Jeremy  
Graduate, Special Education

Mentor

Prof. Yun-Ching Chung

Following federal legislations, more students with emotional disturbances receive education in public schools, often within the general education classroom. While students with emotional disturbances often exhibit significant and chronic behaviors (e.g., physical aggression, self-injury) that impact academic achievement and social development, they can be successful in the general education setting with appropriate behavioral intervention. One of the most intensive behavioral intervention used in school is physical restraint or seclusion. However, there have been serious and harmful consequences due to the improper use of these behavioral intervention. Therefore, I conducted a literature review on the use of physical restraints and seclusion as behavioral intervention techniques. Eight descriptive and case studies, published between 2000 to 2017, were included in this review. Results showed little evidence in supporting these practices, indicating that (a) continued use may inadvertently increase the need for such restrictive interventions, (b) there is a lack of federal guidelines regulating physical restraints/seclusion, and (c) the implementation positive crisis interventions and preemptive behavioral strategies have been shown to be more effective in reducing student aggression. Additional research is needed to better examine the frequency of physical restraints and seclusion, as well as the long-term outcomes on the efficacy of positive behavioral intervention programs.

# VITAMIN D STATUS AND MUSCULAR STRENGTH IN YOUTH: NHANES 2011-2014

Presenter

Pilli, Nicholas

Graduate, Kinesiology & Recreation

Mentor

Prof. Kelly Laurson

Authorship

Nicholas Pilli; Jaime Thomas; Jennifer Barnes; Kelly Laurson

Vitamin D is a critical component of musculoskeletal health in youth. While several studies have established the importance of vitamin D for bone development, research specific to muscular strength is lacking. **PURPOSE:** To investigate the association between serum 25-hydroxyvitamin D (25OHD) status and muscular strength in a nationally-representative sample of U.S. youth. **METHODS:** The analysis included 1,706 boys and 1,644 girls from the National Health and Nutrition Examination Survey 2011-2014 between 6-18.9 years. Status of 25OHD was defined as: severe/deficient  $\leq 37.5$  nmol/L, insufficient  $> 37.5$  to  $< 50$  nmol/L, and sufficient  $\geq 50$  nmol/L. Muscular strength was assessed via handgrip and expressed as age- and sex-specific percentiles of relative strength (kg strength/kg body mass). General linear models were used to quantify differences in strength percentile by 25OHD status. Logistic models were used to compare the odds of low strength ( $< 25$ th percentile) between 25OHD groups. All analyses were stratified by sex while controlling for age, calcium intake, socio-economic status, race/ethnicity, physical activity, body mass index, and season of testing. **RESULTS:** Boys with sufficient 25OHD had a higher mean (SE) relative strength percentile than those in the insufficient or severe/deficient groups, 49.1 (1.8), 43.5 (2.2), and 40.7 (2.9), respectively ( $p < 0.05$ ). Relative strength percentile was also highest for girls with sufficient 25OHD compared to the insufficient or severe/deficient groups, 51.8 (1.9), 45.6 (2.4), and 41.1 (3.3), respectively ( $p < 0.05$ ). Further, boys in the insufficient group had a higher odds of low strength than 25OHD sufficient boys (odds ratio, OR = 1.8, 95%CI 1.1 to 3.0). Both girls in the insufficient and severe/deficient groups were more likely to have low strength compared to those with sufficient 25OHD, OR = 1.8 (1.1 to 2.8) and 3.3 (1.8 to 5.9), respectively. **CONCLUSIONS:** Youth with less than sufficient levels of 25OHD were consistently found to have lower relative handgrip strength and were more likely to have strength values below the 25th percentile. These findings underscore the importance of vitamin D for muscular strength in youth and future prospective studies to elucidate the mechanisms would be of benefit.

# NITRATE CONCENTRATIONS IN STREAMS AS A FUNCTION OF CROP COVER IN MIDWESTERN AGRICULTURAL WATERSHEDS: ASSESSING THE ROLE OF CORN AND SOYBEANS

|           |   |
|-----------|---|
| Presenter | Piske, Jacob<br>Graduate, Geography, Geology, and the Environment |
| Mentor    | Prof. Eric Peterson   |
| Author    | Eric Peterson; William Perry                                      |

Increased availability and reduced cost of synthetic-nitrogen fertilizers have led to excess nitrogen being deposited in reservoirs. The accumulation of nitrogen (N) in reservoirs has negative effects, generating algal blooms, hypoxic zones, and poor drinking water quality. Corn and soybean utilize nitrogen at different rates, resulting in higher nitrogen fertilizer application to fields for corn than for soybean. This work examines whether the nitrate concentration in a stream may be correlated to the percentage of land devoted to growing corn or soybeans in the watershed. To investigate potential relationships, discharge (Q) and nitrate concentration data from ten USGS gauging stations across Indiana, Illinois, Iowa, Kansas, and South Dakota and agricultural land-use data from USDA were analyzed. Watershed areas ranged from 106 km<sup>2</sup> (Spoon River) to 154,767 km<sup>2</sup> (Kansas River). Corn was grown on between 14.31% (Kansas River) to 56.07% (Indian Creek) of the land, while soybeans accounted for 7.19% (Kansas River) to 45.39% (Spoon River). Crop percentages were compared to both weighted flow concentrations and nitrate loads per area from 2008 to 2017. For each system, weighted flow concentration equated to the total annual NO<sub>3</sub>-N-load (kg) divided by the total annual Q. Nitrate load per area represented the quotient of annual NO<sub>3</sub>-N-load (kg) to the watershed area (km<sup>2</sup>). The analyses indicated that as the percentage of corn cultivated in the watershed increased, both the weighted flow concentration and nitrate load per area decreased for all watersheds, except for the Kansas River, which is the largest watershed with the least amount of corn. Collectively, analysis of the data indicated weighted concentrations increase as the percentage of land with corn increases. Opposite trends were observed when the percentage of soybean cultivated in the watershed increased; weighted flow concentration and nitrate load per area all increased with respect to the percentage of soybean cultivated both for individual watersheds and collectively. The one exception being the North Raccoon River. The results imply soybean production has a more direct impact on nitrate concentrations, although corn fertilizer application and total cultivation rates are higher in each watershed.

# ANALYSIS OF COSMETIC PRODUCTS FOR EVIDENTIARY VALUE VIA PAPER SPRAY AND PAPER CONE SPRAY IONIZATION-MASS SPECTROMETRY

|           |                                     |
|-----------|-------------------------------------|
| Presenter | Poehls, Abigail                     |
|           | Undergraduate, Chemistry            |
| Mentor    | Prof. Christopher Mulligan          |
| Author    | Shahnaz Mukta; Christopher Mulligan |

Detection of cosmetic analytes can have intrinsic value in criminal investigations, as traces of such compounds on surfaces (e.g. clothing, skin) can provide complimentary evidence of criminal activity or assist in identifying or locating individuals of interest. On- site analysis, through ambient mass spectrometric methods employed on portable instrumentation, could offer even greater utility to field investigators by allowing the probative value of said evidence to be rapidly assessed. In this work, cosmetic products in both bulk and as trace residues were profiled via paper spray ionization (PSI) and paper cone spray ionization (PCSI) to establish proof-of-principle. The ease of use and minimal sample preparation afforded by these techniques could prove amenable to direct usage by law enforcement and the forensic practitioner communities.

Preliminary testing of cosmetic samples was done on both commercial and portable MS instrumentation. PSI was accomplished with blank testing strips as the paper substrate used for both swabbing surface residues and the ionization source. The volume formed by the wax paper cone serves to hold bulk samples of interest and applied spray solvent.

Cosmetic products examined in this work include lipsticks, lip glosses, foundations, and blemish creams. The complex nature of the samples of interest required a precursory study of optimal spray solvent composition. For trace residue screening, surfaces of interest were swabbed using the testing strips prewetted with solubility-matched solvents. For bulk substance analysis, the efficacy of employing an inner filter paper cone to the PCSI source design was examined. Initial data suggests that such a source design assists in ensuring instrumental hygiene when examining fine powders.

Results presented will include representative MS and MS/MS data, applicability towards common surfaces of interest in forensic investigations, and potential analyte-borne and surface-borne matrix effects.

# WHAT EVIDENCE-BASED APPROACHES ARE BEING USED AT OTHER UNIVERSITIES FOR SUBSTANCE ABUSE STUDENT CONDUCT SANCTIONS

|            |  |
|------------|--|
| Presenter: | Pressburger, Donnelle<br>Graduate, Social Work |
| Mentor     | Prof. Kathryn Conley Wehrmann                  |
| Authorship | Donnelle Pressburger                           |

The purpose of this research study is to explore what other universities are utilizing to assess college students' drinking patterns and what sanctions they use in order to inform the Illinois State University's Student Conduct and Conflict Resolution Department's approach responding to campus alcohol and substance abuse. The intent is to determine whether there are more effective interventions in use at other universities that might be useful for inclusion at Illinois State University. The study will involve contacting universities similar to ISU in terms of size, programming, and type of campus. The sample will include 15 universities throughout the U.S. Data from the universities will be collected via telephone interviews and qualitative techniques will be used to analyze interview data.

# AQUEOUS KINETICS OF ALPHA-HYDROXY HIPPURIC ACID DERIVATIVES BEARING ELECTRON-WITHDRAWING GROUPS AS A FUNCTION OF PH AND BUFFER CATALYSTS

|           |  |
|-----------|--|
| Presenter | Rafie, Mohammad<br>Graduate, Chemistry |
| Mentor    | Prof. Richard Nagorski                 |
| Author    | Katie Feken                            |

It has been shown that carbinolamides are intermediates in the enzyme-catalyzed synthesis of  $\alpha$ -amidated peptides. Although carbinolamides are important intermediates in the production of these hormones and have roles in other biological functions, little attention has been given to their mechanisms of reaction in water, and, thus, it is difficult to speculate how their reaction is enzymatically catalyzed. The purpose of the work presented here was to synthesize structural analogs of the biological intermediates and study their mechanism of breakdown in water.  $\alpha$ -Hydroxyhippuric acid (1), substrate for the enzymatic system, provides an easily modified template for the study of the breakdown of this carbinolamide system. The pH-rate profiles for various aromatic substituted derivatives of 1 will be presented, and the mechanism of the acid, hydroxide and buffer catalyzed reactions discussed. The effect of metal-ions on the rate of the reaction was also investigated as it is known that peptidylglycine  $\alpha$ -amidating monooxygenase enzyme has a metal-cofactor whose role is poorly defined.

# **EMPLOYEE BURNOUT AND TURNAROUND FOR THE SCREENING, ASSESSMENT AND SUPPORT SERVICES PROGRAM AT THE CENTER FOR YOUTH AND FAMILY SOLUTIONS.**

Presenter

Register, Jacob

Graduate, Social Work

Mentor

Prof. Kate Sheridan

Authorship

Jacob Register

This study explores factors associated with staff turnover from the perspective of current and former staff at the Center for Youth and Family Solutions (CYFS), Screening, Assessment & Support Services (SASS) program. Participants are invited to respond to an electronic survey exploring issues such as on-the-job demands and burnout, as well as supports for staff. Participants are adults aged 18 years of age or older who are currently or were formerly employed as a SASS worker at CYFS. Findings from the study will inform improvements to staff supports aimed at reducing staff turnover.

# PUTATIVE PECTATE LYASE IS INVOLVED IN DEVELOPING PAPILLAE STRUCTURES ON TRICHOME CELL WALLS

Presenter

Rickerd, Trevor  
Graduate, Biological Sciences

Mentor

Prof. Viktor Kirik

Authorship

Trevor Rickerd; Christy Fornero; Gabrielle Dowell; Viktor Kirik

Plant cell walls are used in dynamic ways to aid in a number of functions, such as mechanical support, cell shape, transport of solutes, and defense from pathogens. Specialized cell types can organize their cell walls in unique ways pertinent to their function. Trichomes, or plant hairs, develop relatively thick cell walls that develop small, round, opaque structures called papillae in late-stage cell wall development.

Our work focuses on the glassy hair 3 (glh3) mutation that results in a "glassy", transparent trichome phenotype, caused by the lack of developed papillae structures on the trichome's cell wall. We have found that a gene encoding a putative pectate lyase enzyme has a mutation in a theoretical calcium binding site. We have found expression in trichomes, cotyledon tips, and funiculi using promoter-GUS gene expression assays. We have utilized scanning electron microscopy to quantify the number and density of papillae on trichomes of wild-type, mutant, and rescue plants. We have found that the GFP-Pectate Lyase is secreted across the cell membrane and localizes specifically to the papillae of the cell. To determine the mechanism by which the Putative Pectate Lyase is secreted across the cell membrane, we will perform a Brefeldin A ER-Golgi trafficking blocker assay. We have designed fluorescent constructs combined with the N-terminal signal peptide of the putative pectate lyase enzyme to determine if the N-terminal signal peptide is sufficient to allow proteins to accumulate in papillae. To determine whether the degree of methylesterification influences papillae formation, we have expressed a pectin methylesterase inhibitor with a trichome-specific promoter to prevent pectin methylesterases from removing the methyl groups from pectin in the secondary cell wall.



# SINGLE LEG HOP LANDING ANALYSIS IN PATIENTS WITH CHRONIC ANKLE INSTABILITY AND LATERAL ANKLE SPRAIN COPERS

|            |  |
|------------|--|
| Presenter  | Rine, Jordyn<br>Graduate, Kinesiology & Recreation |
| Mentor     | Prof. Justin Stanek                                |
| Authorship | Jordyn Rine; Adam Jagodinsky; Justin Stanek        |

Context: It has been reported that 28,000 ankle injuries occur per day in the United States, making it one of the most common sports-related injuries. Additionally, lateral ankle sprains account for 80% of all athletic injuries, with an estimated two million ankle sprains occurring in the United States each year. In addition to the high number of individuals who sprain their ankle, approximately 73% will suffer from a recurrent injury. Approximately 59% of those individuals will have residual complaints such as pain, instability, or weakness in the injured ankle that may last up to three years. Due to the wide-spread epidemic that ankle sprains have become, the populations affected by its prevalence need to be examined in order to help and reduce this current problem. There has been ample research previously done within this population, but it only examines the differences that exist between these groups in motionless tasks. For my thesis, I plan on performing a human movement analysis on patients with chronic ankle instability, lateral ankle sprain copers, and healthy individuals to be able to examine the differences between these groups during a functional jumping task.

Objective: The purpose of this study was to determine the differences that exist between chronic ankle instability patients, lateral ankle sprain copers, and healthy individuals during a single leg hop landing.

Design: Analytical study using previously collected data (Jagodinsky et al) Setting: Biomechanics Laboratory Main Outcome

Measure(s): Center of Pressure (displacement, excursion, mean velocity, and variability)

Results: To be determined.

Conclusions: To be determined.

# EFFECTS OF INBREEDING ON LIFE HISTORY TRAITS AND SEXUAL COMPETENCY IN DECORATED CRICKETS

Presenter

Rines, Ian

Graduate, Biological Sciences

Mentor

Prof. Ben Sadd

Co-Mentor

Prof. Scott Sakaluk

Authorship

Ian Rines; Jeannine Oldzej; Christine Hodges; Jenny Harper; Kylie Hampton; Kristin Duffield; John Hunt; Ben Sadd; Scott Sakaluk

Although inbreeding depression in life-history traits has been well characterized, inbreeding effects on mating behavior and sexually selected traits have been less well studied. Here, we assess levels of inbreeding depression in a number of fitness-related reproductive parameters of female decorated crickets. We predicted that due to direct negative effects of inbreeding and a potential tradeoff between reproduction and current survival, as suggested by effects of inbreeding on immunity, inbred females would show significantly reduced reproductive output compared with outbred females. We also examined sex-specific effects of inbreeding on mating competency, focusing specifically on the female's decision to mount a male, and the male's ability to transfer a spermatophore. We predicted that any inbreeding depression in sexual competency should be more evident in the success of spermatophore transfer than in female mounting propensity because of the tighter link between mating success and fitness in males than in females. Inbred females produced fewer offspring with longer development times compared with outbred females, results consistent with theory, as inbreeding depression is expected to be more severe for traits more tightly coupled with fitness. Inbreeding also had sex-specific effects on sexual competency. Inbred females were more likely to mount inbred males than outbred males, whereas outbred females exhibited no such preference. Inbred males were significantly less likely to transfer a spermatophore regardless of female inbreeding status. These results reveal that inbreeding may have unexpected consequences for mate choice, and highlight the importance of considering mating behavior when assessing effects of inbreeding within populations.

# A PROGRAM EVALUATION ON THE EFFECTIVENESS OF THE MULTI-LEVEL INSTRUCTIONAL CLASSROOM IN SECONDARY EDUCATION

|           |                       |
|-----------|-----------------------|
| Presenter | Roberson, Melanie     |
|           | Graduate, Social Work |
| Mentor    | Prof. Kate Sheridan   |

This study examined the effectiveness of a Multi-Level Instructional Classroom (MLIC) approach in improving student behavior. The MLIC classroom consists of 6th, 7th, and 8th grade students referred via an Individualized Education Plan (IEP). Students in the MLIC classroom have a behavior plan as part of their IEP, which is an eligibility requirement for the MLIC classroom. The MLIC approach focused on life skills development and improving academics. MLIC sought to aid students in developing skills to change behaviors that interfered with learning. These behaviors were identified in the student's IEP but not associated with their diagnosis, i.e. refused to work, distracting behaviors such as crying, hiding, stomping feet). The MLIC curriculum targeted 6 behaviors (3 in the fall term, and 3 in the spring). The fall term behaviors targeted in the curriculum included: Being Prompt and Ready, Handling Conflict, and Positive Attitude. In the spring term, the curriculum addressed Appropriate Language, Academic Work, and Specific Target Behaviors of the students. MLIC students were in the MLIC classroom 1st, 3rd, and 8th hours (class periods) and were referred back to the MLIC classroom during any other hour of the day by teachers if the student's behaviors became problematic (this is referred to as a "reset").

# INVESTIGATING ADSORPTION DYNAMICS OF SERUM PROTEINS ONTO GOLD NANOPARTICLES

|            |   |
|------------|---|
| Presenter  | Ruiz, Guadalupe<br>Undergraduate, Biological Sciences |
| Mentor     | Prof. Jeremy Driskell                                 |
| Authorship | Guadalupe Ruiz; Nicki Ryan; Jeremy Driskell           |

Gold nanoparticles (AuNPs) have the potential to improve immunodiagnostics, immunoassays, and biosensing. Many emerging biosensors rely on the immobilization of antibodies onto AuNPs due to the optical properties of the AuNPs and the specificity of antigen binding by antibodies. Preferably, the AuNP-antibody conjugate interaction will be stable and strong enough that their interaction will not be affected by exposure to biological systems. However, AuNPs can interact with biological components affecting its reliability and performance. In this research, our group investigated the adsorption interaction of common blood serum proteins (transferrin, human serum albumin (HSA), IgG, Fibrinogen) onto AuNPs and the ability of these serum proteins to displace antibodies from antibody-AuNP conjugates. Our group used nanoparticle tracking analysis (NTA) to study serum protein and antibody adsorption on AuNP by measuring the mean size increase of the functionalized conjugates. Our data show a monolayer of protein was formed at saturation for each protein and the maximum size increase correlated with the protein size. Additionally, adsorption data was best-fit to the Hill-Langmuir equation to extract the adsorption affinity for each protein. Lastly, the ability of blood serum proteins to displace antibodies from the surface of AuNPs was investigated using an enzyme-mediated assay. Preliminary experiments suggest that serum protein cannot displace antibody during one hour of exposure, but prolonged exposure may result in protein exchange. Ultimately, these studies elucidated the differences in blood protein adsorption onto AuNPs and the stability of antibody-AuNP conjugates when exposed to blood protein serums. Results of this work will help to define the capabilities and limitations of antibody-AuNP enabled biosensors.

# THE INFLUENCE OF SAND AND CLOTH TERTIARY FILTRATION ON MICROPLASTIC PARTICLES

Presenter Rusthoven, Ian  
Graduate, Geography, Geology, and the Environment  
Mentor Prof. Catherine O'Reilly  
Co-Mentors Profs. Eric Peterson; William Perry  
Authorship Catherine O'Reilly; Eric Peterson; William Perry

Plastic debris is ubiquitous in nature and can have adverse effects on marine and terrestrial ecologies. Microplastic particles have many anthropogenic sources, and a relative pathway for microplastics enter the environment is through our residential wastewater. Wastewater must be treated at Wastewater Treatment Plants (WWTP's) through a series of primary, secondary, tertiary treatment processes. Within Central Illinois there are numerous WWTP's that have differing filtration techniques in place to treat incoming wastewater. Most importantly, there are distinct differences in tertiary treatment methods like sand, cloth, and no tertiary treatment processes at these WWTP's. It is important to determine what tertiary treatment techniques reduce incoming microplastic particles within wastewater. How well do sand and cloth tertiary filtration methods reduce microplastics in our wastewater effluent?

I hypothesize that cloth filtration will reduce microplastic debris the most compared to the other tertiary treatment methods in my study. The differing sand and cloth filtration techniques used at these plants can give us insight as to which filtration methods work best at microplastic reduction within the WWTP process. In order to determine what filtration techniques work best, 333µm neuston plankton net was submerged within the treatment process to collect microplastic debris. Strategic points before and after tertiary filtration techniques aided in determining how well these filtration methods reduce microplastics in wastewater effluent. Microplastic particles are then counted (fibers, beads, fragments) to determine what filtration methods are ideal for microplastic reduction.

Results from this study will shed light on how well tertiary filtration methods can reduce incoming microplastic loads in wastewater. Cloth filtration so far has not reduced microplastics as well as initially thought. Without a reduction of plastic products, our environment and biological communities will be seriously threatened as a result of our disposable lifestyle.

| Location | Population Served | Tertiary filtration |
|----------|-------------------|---------------------|
| Heyworth | 3,200             | None                |
| BNWRD S  | 35,328            | Fine Sand           |
| BNWRD W  | 92,927            | Coarse Sand         |
| UCSD S   | 55,000            | Cloth (10µm)        |
| UCSD N   | 100,000           | Cloth (10µm)        |

# FACTORS AFFECTING LOAD SELECTION AND WORKER DIVISION IN THE FORAGING CASTE OF ATTA CEPHALOTES

Presenter

Ryan, Micaela

Undergraduate, Biological Sciences

Mentor

Prof. Steven Juliano

Co-Mentor

Prof. Rachel M. Bowden

This study examines factors affecting worker division and load size in *Atta* foragers. As *Atta* age, their mandibles wear down causing them to change from predominantly cutting leaves to carrying them as they forage. Physical restrictions on cutters limit the leaf fragment size they are able to cut. Foragers cutting will have predominantly sharper mandibles and cut fragments that closely match their body size. Foragers carrying will have more individuals with worn mandibles, and fragments that do not match their body size. I located three *Atta* colonies, and collected 20 carriers and 20 cutters per colony. I weighed the ant and leaf to determine if the interaction between ant weight and ant type and its effect on leaf mass was significant. A strong positive correlation between leaf mass and ant mass was found in foragers carrying, but there was essentially no correlation in foragers cutting. I measured the mandible lengths and first tooth lengths of both the left and right mandibles to determine if the interaction between ant type and mandible length and its effect on first tooth length was significant. A strong positive relationship was found between first tooth length and mandible length. However, this relationship was the same in both the carriers and the cutters indicating the interaction between mandible length and ant type and its effect on first tooth length was not significant.

**Keywords:** *Atta cephalotes*, foragers, cutter, carrier

# THE NATALITY EFFECT OF THE EARNED INCOME TAX CREDIT

|            |                      |
|------------|----------------------|
| Presenter  | Sader, Jerome        |
|            | Graduate, Economics  |
| Mentor     | Prof. Bibek Adhikari |
| Authorship | Jerome Sader         |

This initial paper utilizes a two period cross-sectional panel data with a first differenced equation that corrects for heteroskedastic standard errors in order to estimate the impact of the 2011 Connecticut Earned Income Tax Credit law, that adds an extra 30% to the federal Earned Income Tax Credit benefit that a household tax filer receives, on the fertility rates of Connecticut communities. Using zip code population data from the American Community Survey and zip code Earned Income Tax Credit participation figures from a partnership between the Brookings Institution and the IRS, I estimate a model that uses zip codes from Rhode Island and Massachusetts as controls and zip codes from Connecticut as the treatment group. The model controls for shifts in incomes, hours worked, education, and Earned Income Tax Credit participation rates and finds no statistical evidence that the treatment group changed their fertility rates from the control groups. However, the regression does suggest that an increase of Earned Income Tax Credit participation in a zip code is associated with a statistically significant decrease in its fertility rates.

In future study, I plan to use a similar model to study the impact of the Earned Income Tax Credit across all states that have implemented the tax incentive between 1997 and 2016. By exploiting the variations in birth rates in states with various tax credit incentives, controlling for national trends in birth rates, this study can draw conclusions about the relationship between the tax program and macro-level natality.

# IS SCIENTOLOGY A RELIGION?

Presenter

Salzman, Ashley  
Graduate, Biological Sciences

Mentor

Prof. Daniel Breyer

According to the Internal Revenue Service agency, Scientology is an official religious organization, and therefore has received tax exempt legal status since 1993. Former Scientology members, legal commentators, and the general public have debated whether or not Scientology is a true religion for decades. Many former Scientologists cite alleged abusive practices of the Scientology organization as reason that Scientology should not be considered a religious organization. However, in order to dismantle Scientology's title as a "church" under U.S federal guidelines, anecdotal evidence has not sufficed and it is necessary to research, outline, and present all of the ways in which Scientology may or may not meet the federal guidelines outlined by the IRS for representation and privileges that come along with the title of "church". This presentation outlines the IRS federal guidelines for the definition of a church and presents the research on whether or not Scientology appropriately meets these official standards.



# GENOTYPES OF BACTERIA AND HOST DRIVE SPECIFICITY OF COLONIZATION IN A BUMBLE BEE AND GUT SYMBIONT SYSTEM

|            |  |
|------------|--|
| Presenter  | Sauers, Logan<br>Graduate, Biological Sciences |
| Mentor     | Prof. Ben Sadd                                 |
| Authorship | Logan Sauers; Ben Sadd                         |

Microbes have long been investigated in a negative context as disease causing pathogens. Recent studies have shifted the focus to highlighting the beneficial interactions between hosts and their resident microbial communities, or microbiota. In bumble bees, coevolved and vertically transmitted core gut microbes are critical for the health of these important pollinators, through their involvement in digestion, detoxification, pathogen defense, and immune development. *Snodgrassella alvi* is a key gut bacterial symbiont in the Apid bees, including bumble bees. As the first gut colonizer, *S. alvi* forms a biofilm, which is likely critical for the subsequent establishment of other gut microbes. Thus, understanding *S. alvi* colonization has important implications for microbiota development and for bee health. This work aims to investigate the effects of bacterial strain and host genotypes on the colonization of *S. alvi* within bumble bee hosts. Using multiple strains of *S. alvi* isolated from different colonies of the bumble bee *Bombus impatiens*, together with colonization experiments across different host genotypic units, we find a significant genotype-by-genotype interaction determining the colonization of this beneficial gut microbe. These genotype-by-genotype interactions show specificity between microbe and host in this system is much finer than previously demonstrated specificity at the level of host genera. Furthermore, interactions between host and microbial genotypes have many important ecological and evolutionary implications.

# IS A WRAPAROUND JUVENILE PROBATION PROGRAM BEING IMPLEMENTED AS DESIGNED?

|            |                               |
|------------|-------------------------------|
| Presenter  | Scott, Bria                   |
|            | Graduate, Social Work         |
| Mentor     | Prof. Kathryn Conley Wehrmann |
| Authorship | Bria Scott                    |

The 61605-zip code is the most economically distressed zip code in Peoria, IL 61605. By integrating among community partner agencies, the system of care will be able to coordinate service supports and resources that meet the ever-changing needs of the students and families of Peoria Public Schools and the Greater Peoria Area. A goal of the WrapAround Center is to "wrap" students, families and adults with support and resources that meet the needs of students and their families within the community. Peoria County Juvenile Probation has over 90 clients that are living in the 61605-zipcode and will be moving an office to the WrapAround Center. It is anticipated there will be a stronger likelihood of compliance with probation requirements among their most economically distressed clients. Juvenile Probation focuses on treating individuals with mandated services by holding juveniles accountable by going to court, attending school on regular basis, attending classes that will help with specific goals to each individual, and by passing drug screens given by probation.

This project focuses on the Peoria County Juvenile Probation and interviewing its members (which consist of two juvenile probation officers.) The director of the Peoria Public School's Social Emotional Learning, Administrators within the school that the WrapAround Center is based in, along with Peoria Public School Social Workers, and agencies that have direct services in the WrapAround will be interviewed. The interviews are intended to obtain the perspective of each of the team members to gain their perspective on how the juvenile probation program is working and if they believe the program is following the WrapAround's logic model. The information from the interviews will be transcribed and analyzed to find common themes in order to determine if the Peoria County Juvenile Probation is being implemented as originally intended as well as what might be done to improve the program.

# WHAT ARE CASEWORKERS' PERCEPTIONS OF SBC IN HELPING CLIENTS ACTIVELY CREATE POSITIVE CHANGE IN THE LIVES OF THEIR FAMILIES?

Presenter

Sender, Autumn

Graduate, Social Work

Mentor

Prof. Kathryn Conley Wehrmann

Solution Based Casework (SBC) is a practice model that is currently being implemented into the daily work of caseworkers with clients in the Intact Family Program at Children's Home and Aid Society Illinois (CHASI). Solution-Based Casework is an approach to assessment, case planning, and case management that combines what we know from clinical social work with what we value about sound social work practice" (Christensen, Todahl, & Barrett, 2008). SBC is a model that aligns with the program goals of child welfare work: safety, permanency, and well-being (Antle 2009). This study will explore how case managers are implementing the SBC model into their daily work with families and clients in the child welfare field. The sample for this study will consist of Intact Family Services case managers working in Illinois who will be recruited via email to participate in completing an online survey. The data collected from this survey will be analyzed and used to inform case manager practice with the SBC model. The SBC model is still new to the field of child welfare and SBC is being implemented in Intact Family services across the state of Illinois this year. It is anticipated the findings from the project will offer some insight into currently successful strategies of implementation and also areas that are presenting challenges to caseworkers.

# CAREGIVER BURDEN IN RELATION TO RESIDENT'S LEVEL OF CARE IN A CONTINUING CARE RETIREMENT COMMUNITY

|            |                       |
|------------|-----------------------|
| Presenter  | Settles, Grace        |
|            | Graduate, Social Work |
| Mentor     | Prof. Kate Sheridan   |
| Authorship | Grace Settles         |

This study explored participant's perception of caregiver stress. Participants were adults aged 18 years of age or older who have a loved one currently receiving services at Luther Oaks (Bloomington, IL). Luther Oaks is a life-plan community which encompasses three levels of residential care on a continuum ranging from independent living to assisted living to skilled nursing care. Assisted living is further broken down into assisted living, memory care, and respite. The study aimed to assess caregiver stress via the "Caregiver Self-Assessment Questionnaire" which is a self-report measure devised by the American Medical Association as a means of predicting stress-levels of family caregivers caring for chronically ill older adults. Findings from the study will inform social work staff at Luther Oaks regarding the aggregate level of stress experienced by caregivers across all levels of care. Social work staff can utilize the data to develop educational materials regarding self-care as well as community-based and agency-based resources for caregivers.

# CHICAGO'S MILLENNIUM PARK: FINDING NATURE IN THE CITY

|            |   |
|------------|---|
| Presenter  | Sheffield, Nicolette<br>Graduate, Geography, Geology, and the Environment |
| Mentor     | Prof. Eric Godoy  |
| Co-Mentor  | Prof. Alec Foster   |
| Authorship | Nicolette Sheffield; Eric Godoy; Alec Foster                              |

Urban parks are often developed from degraded or cast aside areas which a city then transforms into a central space for various recreational activities and enjoyment. The transformation of land into a communal and public space has instigated debate over the idea of ridding an area of its naturalness to accommodate features purely associated with anthropocentric functionality and interests. Environmentalists and philosophers debate the meaning of the concept of nature and attempt to define whether anthropogenic activities are considered within the realm of nature. Drawing from recently published literature in the fields of environmental philosophy and urban studies, I argue for the restoration of nature, in the context of urban parks, to still be viewed as a form of nature. I conceptually analyze the present debate on nature and human-nature interaction to conclude nature is everywhere and in everything. Our human influences on an area, such as restored or developed urban environments, should not be considered unnatural because we too are a part of nature.

The 24.5-acre area Millennium Park in Chicago, Illinois, was previously a series of rail lines and parking lots along the lakefront and considered to be an eyesore. Park designers Daniel Burnham and Edward Bennett considered the railroad's control of the area to be so untouchable that plans for a neighboring urban park were specifically made around the property in their 1909 Plan of Chicago. It was not until 1997 that Mayor Richard M. Daley began redevelopment of the area. Transformation of the area spanned over seven years and exceeded the initial budget of \$150 million; however, today Millennium Park is internationally recognized and draws many tourists to gaze at the beauty of 'city nature'. Features such as Cloud Gate and the Lurie Garden add to the park's aesthetics, revealing how humans may sculpt an area's image to enhance its naturalness. Human action in the redevelopment and incorporation of urban planning and design has not excluded Millennium Park from being a form of nature in the city.

# CORRELATING NUTRIENT UPTAKE AND STREAM METABOLISM IN URBAN CEMENT-LINED STREAMS

|            |  |
|------------|--|
| Presenter  | Sieggreen, Grace   |
|            | Graduate, Geography, Geology, and the Environment              |
| Mentor     | Prof. Catherine O'Reilly                                       |
| Authorship | Grace Sieggreen; Catherine O'Reilly; Eric Peterson; Bill Perry |

In order to improve anthropogenic efficiency, streams found in urban regions are often altered with a cement-lined bed. These cement-lined streams however, are responsible for highly nutrient rich waters causing eutrophication and poor water quality in downstream environments. The excess nutrient is unable to penetrate the cement surfaces and contact the hyporheic zone that aids in much of the nutrient retention. However, nutrient retention in cement-lined streams is still possible through uptake by the algae and microbes growing on the stream bed. The demand of nutrient by the algae and microbes can be monitored by identifying trends in the rate of retention or uptake velocity ( $V_f$ ). Previous studies suggest that the uptake velocity can be affected by the productivity or metabolism of the algae and microbes, meaning that more productivity will result in more nutrient removal. Yet these studies have been restricted to environments other than cement-lined streams. Therefore, the purpose of this study is to understand the connection between the algal and microbial activity and the nutrient removal in a cement-lined stream setting.

This will be done by measuring ammonia ( $\text{NH}_4^+$ ) and phosphate ( $\text{PO}_4^{3-}$ ) removal rates as well as stream productivity in various cement lined streams in Normal/Bloomington, Illinois. The removal rates will be measured by conducting *in situ* uptake analyses and testing collected samples for  $\text{NH}_4^+$  and  $\text{PO}_4^{3-}$ . The activity of the algae and microbes will be measured by deploying dissolved oxygen data recorders at stream sites. From this, the dominant activity, either algal gross primary production (GPP) or microbial community respiration (CR), can be calculated. It is expected that for a cement-lined stream in comparison to other environments that uptake velocities will be high (based on previously collected data), and most of the stream metabolism will be in the form of GPP due to the high exposure to sunlight cement lined streams experience.

# TEACHERS AS PRIMARY IMPLEMENTORS OF SOCIAL EMOTIONAL LEARNING AND THE INFLUENCE OF EMOTIONAL SELF-REGULATION ON IMPLEMENTATION

|            |                           |
|------------|---------------------------|
| Presenter  | Signa, Caroline           |
|            | Undergraduate, Psychology |
| Mentor     | Prof. Adena Meyers        |
| Authorship | Caroline Signa            |

Existing research indicates the importance of high quality social-emotional learning (SEL) implementation efforts. The project is an analysis of literature on teachers as the primary implementers of SEL programs and how teachers' beliefs and attitudes influence SEL implementation. Teachers' beliefs and attitudes about SEL and their thoughts and feelings about emotions and emotional expression have the capability of influencing the way SEL programs are delivered, the evaluation of the programs, and the results produced by the programs (Bracket et al, 2012). Relatedly, teachers' own emotional self-regulation skills may contribute to their reactions to students' emotions and their ability to afford a secure classroom environment for their students (Poulou, Bassett, & Denham, 2018). This study will review research on these processes and provide recommendations regarding strategies to support teachers in their efforts to implement SEL programs and to scaffold children's social and emotional development in the school setting.

# EXPLORING PARTICIPATION RATES AND ATTITUDES TOWARD PUBLIC PARKS AND RECREATION

Presenter

Simpson, Lauren

Graduate, Kinesiology & Recreation

Mentor

Prof. Mike Mulvaney

A community's parks and recreation department provides programming and facilities that enhance wellness, promote an active lifestyle, and foster a sense of community between its residents. Public park and recreation agencies are an integral part of a community and must keep pace with the changing needs and interests of their residents. This makes it essential to assess and understand household's participation rates and attitudes towards these park and recreation services and facilities. The purpose of this study was to examine community members' current participation patterns and attitudes towards public parks and recreation services to assist these agencies with their short and long-range planning efforts. Households within the City of El Paso (El Paso, IL) and surrounding communities served as the sample for the study. A web-based survey was developed and distributed to the residents within the City of El Paso (El Paso, IL). Households in surrounding communities were also surveyed to explore possible differences in participation rates and attitudes based on geographical location. When variables such as age, residential location, and length of time living in the community were compared, T-test results indicated few differences in satisfaction levels and participation rates between groups. In particular, the findings suggest that household location had little influence in overall satisfaction with the agency's programming. On the other hand, age and time in the community were found to be positively correlated to programming satisfaction. Complete findings will be presented.



# THE EFFECTIVENESS OF TEAM BASED CARE FOR CHRONIC PAIN PATIENTS IN A PRIMARY CARE SETTING

|           |                               |
|-----------|-------------------------------|
| Presenter | Smalley, Chelsea              |
|           | Graduate, Social Work         |
| Mentor    | Prof. Kathryn Conley Wehrmann |
| Author    | Chelsea Smalley               |

Integrative behavioral health in a primary care setting is a relatively new type of care. This type of care is mostly prominent on the East Coast of the United States, but is becoming more popular throughout the country. It was found that mental health impacts physical health and physical health impacts mental health. Because of this, licensed clinical therapists were integrated into primary care medical centers to provide behavioral health services. The service provided is short term counseling that is focused on goal setting. Typically, sessions are thirty minutes long for about six to eight sessions. The therapist can also help to advocate for the patient if the patient is having difficulty with their medical provider or outside service providers. Chronic pain is a reoccurring medical condition found in the primary care setting. With the rise of the opioid epidemic, chronic pain patients have been challenging to manage. OSF St. Francis in particular has significantly reduced prescribing opioids to patients. Chronic pain patients are often referred to the behavioral health consultant on staff to work on coping skills, pain management, and/or mental health conditions associated with chronic pain. The primary care physician and behavioral health consultant become a team when treating chronic pain patients to ensure that their physical, emotional, and mental health needs are being met.

This project focuses on the members of the OSF integrative behavioral health team and the medical providers at the OSF Morton Medical Group. The behavioral health team consists of fourteen therapists, one supervisor, and one manager. The members are located throughout the state of Illinois and one member in Escanaba, MI. Medical providers will be limited to nurse practitioners, physician assistants, and doctors at the medical group. Surveys will be created and sent via email using the program, Qualtrics, to each participant. The survey will explore the benefits and/or disadvantages to team based care related to chronic pain patients. The information from the surveys will establish themes of the current state of team based care. The goal of this research will be to find ways that team based care can be improved in order for chronic pain patients to receive the best quality care.

# TALLGRASS VS. HILL PRAIRIES: FLORAL TRAITS AND HABITAT SIZE INFLUENCE BEE POLLINATOR DIVERSITY

|            |                               |
|------------|-------------------------------|
| Presenter  | Smith, Jesse                  |
|            | Graduate, Biological Sciences |
| Mentor     | Prof. Diane Byers             |
| Authorship | Jesse Smith; Diane Byers      |

Historically 60% prairie, Illinois has now lost 99% of this habitat to agriculture. These remaining areas are referred to as remnants. To preserve these often small patches of native prairie, we need to better understand interactions between the above- and below- ground communities. Remnant prairies have not been disturbed by modern agriculture plowing techniques, preserving soil microbial communities and plant-microbial interactions. Soil microbes may interact with plants to alter the size of flower displays, and thus indirectly affect pollinators of the plant. Bees are key for plant reproduction for many prairie plants, and globally, many bee species are in decline. In North America, there are approximately 4,000 species of bees, of which, approximately 400 can be found in Illinois. Through sampling and behavioral observations, I will test the hypothesis that biotic and environmental differences in remnant tallgrass and hill prairie soil alter floral traits and thereby affect the abundance and diversity of bee pollinators. My first objective is to quantify floral traits and relate pollinator visits to flower characteristics. My predictions are: (1) due to a higher amount of nutrients and soil moisture, the plants and subsequent floral displays will be larger in the tallgrass prairies, and (2) the larger floral displays of the tallgrass prairies plants will promote greater diversity and yield more visits of bees than the smaller flowers in hill prairies. My second objective is to evaluate the biodiversity of bees in the two remnant prairie types. I will use bee bowls to capture bees for identification in the prairie types, formally cataloging the diversity. I predict: (1) the tallgrass prairies will have a more diverse and greater abundance of bees (2) prairies of larger area will have greater bee diversity than smaller prairies. In the future, I will conduct a follow-up greenhouse study to more directly link soil microbes to plant traits. The combination of approaches provides insights into how the contrasting soil characteristics of tallgrass and hill prairies enhance or diminish the attraction of plants to pollinators. Given the global decline of native bees, elucidating links between the soil microbial communities to the pollinators, mediated by the plants, will assist in determining how degraded soils need to be altered for successful restoration of plant-pollinator communities.

# WHAT BARRIERS TO TREATMENT AND SELF-CARE DO CAREGIVERS OF CHILDREN WITH ASD EXPERIENCE?

Presenter

Smith, Trista

Graduate, Social Work

Mentor

Prof. Kathryn Conley Wehrmann

Authorship

Trista Smith

There are many different services that can be utilized for a child with Autism Spectrum Disorder. These services are often fragmented and hard to navigate. Caring for a children with Autism Spectrum Disorder also requires a large amount of time and effort. This study proposes to identify barriers to services and self-care for the caregivers of children with Autism Spectrum Disorder. A focus group will be conducted with parents from a local Autism support group to start a discussion about barriers to care and identify personal strengths. The focus group will be recorded, and responses coded to identify different categories of information. The results of this study will help to identify the barriers to care that need to be addressed, and what steps professionals in the field can take to better support families with children with Autism Spectrum Disorder.

# SYNTHESIS OF NOVEL HEXANUCLEAR RHENIUM SELENIDE CLUSTERS CONTAINING ALKYNYL LIGANDS

|            |  |
|------------|--|
| Presenter  | Soto, Ernesto                              |
|            | Graduate, Chemistry                        |
| Mentor     | Prof. Lisa Szczepura                       |
| Authorship | Ernesto Soto; Colleen Chin; Lisa Szczepura |

The Szczepura research group is interested in developing the organometallic chemistry of hexanuclear cluster complexes. Towards this end, we prepared the first rhenium selenide cluster complex to contain an alkynyl ligand, i.e.,  $[\text{Re}_6\text{Se}_8(\text{PEt}_3)_5(\text{C}\equiv\text{CPh})]^+$ . This presentation will discuss the synthesis and characterization of this cluster complex as well as our progress towards the synthesis of the bis(alkynyl) complexes, *cis*- and *trans*- $[\text{Re}_6\text{Se}_8(\text{PEt}_3)_4(\text{C}\equiv\text{CPh})_2]$ . In addition, we will discuss the reactivity of the newly prepared species with various electrophilic reagents. Our studies are aimed at developing the fundamental chemistry of octahedral cluster complexes. Characterization techniques utilized were elemental analysis, mass spectrometry, fourier-transform infrared spectroscopy and nuclear magnetic resonance spectroscopy.

# THE ROLE OF FLOATING GARDENS TO IMPROVE THE WATER QUALITY OF THE CHICAGO RIVER

Presenter

Spooner, Emmett

Graduate, Geography, Geology, and the Environment

Mentor

Prof. Eric Peterson

Authorship

Eric Peterson

The pollution of heavy metals within surface and groundwater is a rising global concern. Heavy metals such as arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc can be detrimental to both the environment and human health. As heavy metals are transported through rivers, they can be absorbed onto algae and bioaccumulate through the food web, leading to harmful concentrations within the waterways and sediment. In urban areas, the continual use of road salts is a concern as elevated concentrations of chloride ( $\text{Cl}^-$ ) can reduce the quality of both groundwater and surface water. Heavy metals may become mobilized due to both the physical and chemical changes in  $\text{Cl}^-$  altered soil and become more available for plant uptake. Since surface waters can carry heavy metals and  $\text{Cl}^-$  salts over a large distance, methods of in-situ phytoremediation are of growing importance. One promising solution to reduce the heavy metal and chloride concentrations is the use of floating gardens on streams and rivers. The use of floating gardens has been reported to cause significant decreases in the nutrient concentrations of surface waters. However, floating gardens are a relatively new concept and the majority of studies are about their effectiveness of nitrogen, phosphorus, and  $\text{Cl}^-$  reduction with little to no information available on the effectiveness of heavy metal reduction. This study aims to answer the following question: 1) Do floating gardens provide an in-situ method of phytoremediation for heavy metals? To address this question, two hypotheses are proposed: 1) Heavy metal concentrations of the waters upstream from the floating gardens will be higher than the concentrations downstream and 2) Chloride concentrations of the waters upstream from the floating gardens will be higher than the concentrations downstream. Successful completion of this work will provide an understanding of a new method of phytoremediation that has potential for application across the globe.

# **SYNTHESIS AND AQUEOUS KINETICS OF CARBINOLAMIDES DERIVED FROM BENZALDEHYDE AND ISOMERS OF NICOTINAMIDE**

|            |                          |
|------------|--------------------------|
| Presenter  | Steiner, Grant           |
|            | Undergraduate, Chemistry |
| Mentor     | Prof. Richard Nagorski   |
| Authorship | Sarah R. Holland         |

Carbinolamides are formed from the reaction of an amide and an aldehyde. The compounds are interesting due to their various roles in biological systems, where they are intermediates in peptide hormone synthesis and the deleterious modification of DNA that can lead to Cancer. Carbinolamides have also been increasingly important in a variety of compounds having interesting pharmaceutical properties. Given the growing interest in the functionality, it is interesting to note that our understanding of how these compounds react under aqueous conditions is somewhat limited. In addition, the effect of structural variation on the reactivity of carbinolamides is also not well understood. Studies within our research group have investigated a variety of structural variations on carbinolamides and the subsequent effect on their aqueous reactivity. The studies described here involve using nicotinamide derivatives as the amide source to synthesize the carbinolamide itself, followed by the aqueous kinetics. This work will describe the synthesis of the carbinolamide compounds from the nicotinamide starting materials and the initial aqueous kinetics in water as a function of pH.

# RAPID PROFILING OF AUTHENTIC FORENSIC EVIDENCE VIA PAPER CONE SPRAY IONIZATION EMPLOYED ON PORTABLE MS INSTRUMENTATION

|            |  |
|------------|--|
| Presenter  | Stelmack, Ashley<br>Graduate, Chemistry                                  |
| Mentor     | Prof. Christopher Mulligan   |
| Authorship | Ashley Stelmack; William Fatigante; Shahnaz Muktah; Christopher Mulligan |

Ambient MS methods have been shown applicable to forensic chemical analysis, but bear further refinement to allow rapid profiling of authentic evidence types. This is of particular interest when considering deployment on portable MS instrumentation with reduced vacuum capabilities, as instrumental hygiene and carryover are of increased concern. Paper cone spray ionization (PCSI) featuring on-board filtration has been demonstrated as robust to the analytical constraints of authentic forensic evidence screening, particularly towards bulk phases (e.g. powder-based drugs, tablets, paraphernalia, etc.). Efficacy towards processing and identification of evidentiary seizures with a portable MS system is presented herein.

All investigations employed the FLIR Systems AI-MS 1.2, a portable CIT-based MS system featuring a continuous sampling capillary inlet. For PCSI-MS, the source design featured wax paper folded to produce a triangular pyramidal structure that serves as a reservoir for spray solvent (i.e. 1:1 methanol:water w/ 0.1% formic acid). Samples of interest are first placed into a Whatman filter paper insert, which is folded akin to a druggists' fold and then placed inside the solvent reservoir. This paper insert serves to filter and retain inert/insoluble material during analysis. Application of spray solvent and high voltage extracts analytes of interest and induces ionization via ESI-like processes from the pyramidal egress. Samples analyzed through this work included authentic evidence provided through local police and vice squad contacts (e.g. abused pharmaceutical tablets, psychotropic plants, paraphernalia, adulterated food products, etc.) and proof-of-principle, lab generated scenarios. Included in this dataset are 40+ pharmaceutical table compositions, including: over-the-counter (OTC), prescription-only, known precursors to clandestine drug synthesis, scheduled controlled substances, and clandestinely-produced/counterfeit tablets (e.g. MDMA, alpha-PVP, etc.) All evidence types were analyzed with minimal preparation and handling. MS and MS/MS data were employed for analyte identification. PCSI-MS and MS/MS spectra were similar to that reported for spray ionization techniques in that most analytes were observed as the protonated molecule,  $[M+H]^+$ . Cutting agents and adulterants were also successfully identified in several evidence types. Also presented will be the efficacy of PCSI-MS on portable MS instrumentation towards vice squad operations. Through interactions with local undercover units, our methodology was utilized to assist in the identification of recent seizures and drug buys, and in some cases, test the accuracy or remove the ambiguity of officer-employed colorimetric test kit results. The accuracy of PCSI-MS identifications was then assessed through comparison with subsequent identifications made by state-level forensic laboratories.

# THE IMMEDIATE EFFECTS OF DRY CUPPING THERAPY ON SUBCUTANEOUS HEMODYNAMICS AND PAIN ASSOCIATED WITH NONSPECIFIC NECK PAIN

Presenter: Stephens, Stephanie  
Graduate, Kinesiology & Recreation  
Mentor(s): Prof. Noelle Selkow

**Context:** Even though neck pain is one of the most common musculoskeletal conditions, the true cause of nonspecific (uncomplicated) neck pain is not yet fully understood. Limited high-quality evidence has been shown to support the available conservative treatment options for nonspecific neck pain. Dry cupping therapy is a noninvasive treatment method which involves the manipulation of pressure beneath a cup in order to reduce pain, alleviate adhesions, and promote the healing process. Current research on dry cupping therapy is very limited, therefore most of its true physiological benefits have yet to be proven. Although it is assumed due to visible physiological changes of the skin, it is unknown if local subcutaneous blood flow actually increases, and whether this increase in blood flow affects tissue healing and perception of pain, after performing dry cupping therapy in patients with neck pain. **Objective:** The purpose of this study was to determine if dry cupping therapy decreases levels of perceived pain associated with nonspecific neck pain and increases localized subcutaneous blood flow of the treated tissues. **Design:** Double-blind randomized controlled laboratory study **Setting:** Athletic Training Laboratory Patients or Other Participants: Forty to seventy participants between the ages of 18-40 years old diagnosed with nonspecific neck pain will be included in this study. Participants will be excluded if they had cupping therapy or any other treatment performed within the past 3 months to the neck or shoulder area, history of head, neck, or shoulder injury within the past 6 months, known blood clotting disorder, allergy to lubricant, hypertension, diabetes, cancer, pregnancy, cardiac failure, renal failure, allergic purpura, hernia, psoriasis, eczema, rosacea, varicose veins, phlebitis, hepatocirrhosis, allergic dermatitis, sunburn, open wound, fever, or were taking anticoagulants. **Intervention(s):** Dry cupping, sham cupping, or control. Participants were instructed to lay in a prone position with his or her head resting in a face-pillow. One stationary cup was placed directly over the most painful area between the base of the skull and superior angle of the scapula for 8 minutes. The treatment area was determined by bilaterally palpating the posterior neck musculature to find an area of maximal increased sensitivity. **Main Outcome Measure(s):** Subcutaneous hemodynamics, subjective pain intensity, pain pressure threshold. **Hypotheses:** Regarding subcutaneous hemodynamics, total hemoglobin will increase following the dry cupping intervention better than the sham or control. Subjective pain will decrease while pain pressure threshold will increase for both the dry cupping and sham interventions.



# CAST SOME LIGHT ON THE POSITIVE SIDES: ORGANIZATIONAL POLITICS AS USEFUL TOOLS

|            |                      |
|------------|----------------------|
| Presenter  | Suh, Hyunji          |
|            | Graduate, Psychology |
| Mentor     | Prof. Yongmei Liu    |
| Authorship | Hyunji Suh           |

Organizational politics has traditionally been recognized as a negative phenomenon that obstructs organizational effectiveness. Contrary to common beliefs, however, researchers have discussed and revealed the positive aspects of organizational politics, which indicate that it can function as tools for personal and organizational enhancement. The primary purpose of this research is to examine the underlying reasons for such negative views on organizational politics and investigate its not-so-self-interest driven facets. Specifically, the four dimensions of political skills identified by Ferris et al. (2005) (i.e., social astuteness, interpersonal influence, networking ability, and apparent sincerity) are discussed and the impacts of having high political skills in the workplace in association with other commonly studied individual differences (e.g., personality) are reviewed. This research provides insights to a balanced understanding of organizational politics and ways to engage organizational members with high political skills.

# EVALUATING THE EFFECTIVENESS OF THE BAUM MULTI-TIERED SYSTEMS OF SUPPORT AND BEHAVIOR RESPONSE

|           |   |
|-----------|---|
| Presenter | Thompson, Paul<br>Graduate, Social Work |
| Mentor    | Prof. Kate Sheridan                     |
| Author    | Paul Thompson                           |

This study evaluates the effectiveness of a newly implemented behavior response system utilized by teachers and administrators at Baum Elementary School (Decatur, IL, District 61) titled, the Baum Multi-Tiered Systems of Support and Behavior Response (MTSSBR). MTSSBR consists of a prescribed series of responses to behavior to be used by all staff at the school. The prescribed responses include step 1) a verbal warning (2) 5-minute deduction of recess time; (3) a student-written reflection about the behavior; (4) parent contact; and, (5) office referral. There are 5 behavioral expectations of students for various locations in the school (the cafeteria, assemblies, maker's space, library, care room, hallway, classroom, bathroom, recess, and the bus). The aim of this study is to examine the perceptions of school teachers and administrators regarding the new behavior response system including the fidelity of implementation of the system, their observations regarding the effectiveness of each of the 5 prescribed steps in changing student behavior, and their perceptions of the differences between the MTSSBR model and the former PBIS model utilized by the school last year.

# STUDENT'S PERCEPTION ON PROSPECTIVE EQUINE PROGRAM AT ISU

|           |   |
|-----------|---|
| Presenter | Thompson, Susie<br>Undergraduate, Agriculture |
| Mentor    | Prof. Jennifer Earing                         |
| Co-Mentor | Prof. Michelle Kibler                         |
| Author    | Michelle Kibler; Jennifer Earing              |

According to the American Horse Council, the equine industry contributes approximately \$50 billion annually to the United States economy and provides over 988,000 jobs across the country. In the Department of Agriculture at Illinois State University, the majority of students graduate with a full-time job in place. However, adding equine-related programming to the Department of Agriculture's curriculum would likely increase the percentage of students able to secure a full-time job prior to graduation. Student perspective is an important aspect when evaluating the possibility of adding another sequence to the university catalog. Potential classes within this sequence may include equine nutrition, equine business management or a beginner level riding course. The purpose of this study is to determine what current students with an equine interest at Illinois State University would like to see in an equine program. Data will be collected from equine enthused students via surveys. Areas of investigation may include previous equine experience, career goals, and desired coursework and facilities for an equine program. Expected outcomes from the data collection include the need for hands-on labs, basic equine management courses, and opportunities to job shadow industry professionals. Results from this study will greatly aid in the development and implementation of an equine program at Illinois State University. Furthermore, this study may also highlight the university's need for facilities to supplement coursework with hands-on lab experiences. Incorporating an equine program at Illinois State University would create a more diverse educational experience for students within the department. This diversity would facilitate the development of well-rounded students, as well as provide experiences students can utilize in careers post-graduation.

# HIGH-RESOLUTION MAPPING OF SUBSURFACE TILE DRAINAGE IN AGRICULTURAL FIELDS USING AN UNMANNED AERIAL SYSTEM (UAS)

|            |   |
|------------|---|
| Presenter  | Tilahun, Tewodros                                 |
|            | Graduate, Geography, Geology, and the Environment |
| Mentor     | Prof. Wondwosen Seyoum                            |
| Authorship | Tewodros Tilahun; Wondwosen Seyoum                |

Tile drainage is one of the most widely used conservation practice that helps to drain land flooded by water for agricultural purposes. As a result, tile drainage improves soil moisture conditions, induces aeration, reduces total surface runoff, and increases infiltration. On the other hand, tile drainage affects hydrology (e.g. water quality) by enhancing the delivery of fertilizer applied to streams and surface water bodies. This leads to the development of algal bloom and hypoxic zones in surface water bodies. To alleviate and better manage problems associated with tiles drainage (e.g., water quality) and improve the functioning of tile drainages for the farmers, proper cost-effective and efficient mapping technique is necessary. The objective of this research is to develop a procedure and test the efficiency of mapping tile drainage using thermal and multispectral sensor mounted on Unmanned Aerial System (UAS). Three types of sensors, thermal, infrared, and visible (RGB), mounted on an unmanned aerial system will be used to obtain thermal, near-infrared and visible imagery. Altum 3-in 1- mica sense multispectral camera that integrates a radiometric thermal camera would be used. Altum has five high-resolution narrow bands, producing advanced thermal, multispectral and high-resolution imagery in one flight. DJI M 200 drone will be used to fly the sensor, and Ground control points (GCPs) will be used to calibrate the acquired images. The rate infiltration is different for tiled and non-tiled areas, so do the reflectance (surface characteristics) of the soil before, during, and/or after a rainfall event. This information collected by the Drone will be used to develop a procedure to map tile drainage in agricultural fields. The drone-based map will be compared with field based tile drainage map to assess the effectiveness the method.

# THE CHAMELEON EFFECT THEORY

Presenter

Tomaszynska, Kasia

Graduate, Educational Administration & Foundations

Mentor

Prof. Gavin Weiser

Institutions in higher education strive to increase the diversity of the student population on their campus and expend resources to retain enrollment for students who are marginalized such as Latinx students, African American students, LGBTQ+ students, and students with disabilities to name a few. Many of these students need extra guidance to be successful in college. Beyond these groups, every campus has a certain community that often goes unnoticed. This is because I argue they are a chameleon. Like a chameleon, they change from one experience to another in order adapt to their new environment and culture. Not having a place to call "home," because they are global nomads, the "hidden immigrant", and the "man without a country." They are Third Culture Kids.

Third Culture Kids (TCK) are individuals who have spent an extended amount of their developmental years living in a country or countries different from their parents' country of origin (Abe, 2018; Bonebright, 2010; Lijadi & Van Schalkwyk, 2017; Melles & Schwartz, 2003; Merchant, 2003; Pollock & Van Reken, 2009; Smith & Kearney, 2016; Third Culture Kids: "Hidden Immigrants" on Campus, 2005) TCK are a growing demographic on college campuses, but little research has been done on this student population. Many of these students return to their parents' country of origin to pursue higher education, but because these students have lived a highly mobile lifestyle, they face many challenges and tend to transfer in and out of multiple institutions before they reach graduation. The TCK population are highly under-researched and underserved hindering student development and the college experience. Through a review of extant literature, I have developed my own developmental theory of Third Culture Kids, what I call the Chameleon Effect Theory, to further understand the hardships of TCK and how educators can aid in their transition into the American higher education system. This poster will introduce how the term Third Culture Kid was coined and how educators can support TCK with the six developmental stages I have created to further grasp the life experiences of an American TCK.

# A STUDY OF A PREGNANCY OPTIONS COUNSELING PROGRAM

|            |  |
|------------|--|
| Presenter  | Walls, Jennifer<br>Graduate, Social Work |
| Mentor     | Prof. Kate Sheridan                      |
| Authorship | Jennifer Walls                           |

The purpose of this study was to evaluate what services provided by The Center for Youth and Family Solutions were helpful to women who had experienced a crisis pregnancy in the past. Previous clients of the Pregnancy Options Counseling Program will be randomly selected to participate in a survey about the services that were provided to them during the crisis pregnancy and how helpful services were. Participants were aged 18 years of age or older who received services from CYFS from March 2012 (the month the program started) to November 1 2018. The results will be used by the agency to help guide them as they restructure their Pregnancy Option Counseling Program.

# FRAMING STUDENTS' TRIGONOMETRIC THINKING

|            |   |
|------------|---|
| Presenter  | Ward, Maxwell<br>Undergraduate, Mathematics |
| Mentor     | Prof. Tami Martin                           |
| Co-Mentor  | Prof. Craig Cullen                          |
| Authorship | Maxwell Ward                                |

This study took place in a course focused on the roles of technology in the teaching and learning of mathematics (Cullen, Hertel, & Nickels, in press) populated by preservice secondary mathematics teachers. The focus was on students working in different groups trying to identify the tangent function in a directed length model (Cullen & Martin, 2018; Hertel & Cullen, 2011). Students were interacting with a dynamic geometry environment relating arc lengths and vectors as an alternative to traditional definitions for trigonometric functions. We used three different theoretical frameworks to analyze student thinking and then examined the limitations and affordances of each one. We identified one episode that contained student argumentation (Connor, Singletary, Smith, Wagner, Francisco, 2014) one episode that exposed student concept images and definitions (Tall & Vinner, 1981), and one episode that showed creative and imitative reasoning (Lithner, 2008). We will highlight the types of conclusions that can be drawn from using each framework. We will provide recommendations about the utility of each of the frameworks.

Conner, A. M., Singletary, L. M., Smith R. C., Wagner, P. A., & Francisco, R. T. (2014). Educational Studies in Mathematics, 86, pp. 401-429. doi: 10.1007/s10649-014-9532-8

Cullen, C. J., Hertel, J. T., & Nickels, M. (in Press). The roles of technology in mathematics education. The Educational Forum.

Cullen, C. J., & Martin, T. S. (2018). Exploring trigonometric relationships: Is it a function? In Editors, Proceedings of the 40th Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education (pp. 259-262). Greenville, SC: Publisher.

Cullen, C. J., & Martin, T. S. (2018). Discovering trig identities in geometric representations. The Mathematics Teacher, 112(3), p. 260.

Hertel, J., & Cullen, C. (2011). Teaching trigonometry: A directed length approach. In L. R., Wiest, & T. Lamberg (Eds.), Proceedings of the 33rd Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education (pp. 1400-1407). Reno, NV: University of Nevada, Reno.

Lithner, J. (2008) A research framework for creative and imitative reasoning. Educational Studies in Mathematics, 67, pp. 255-276. Available at <https://doi.org/10.1007/s10649-007-9104-2>

Tall, D., & Vinner, S. (1981). Concept images and concept definition in mathematics with particular reference to limits and continuity. Educational Studies in Mathematics, 12, pp. 151-169. doi: 10.1007/BF00305619

# STEREOTYPES OF THE ATHLETIC TRAINING PROFESSION

Presenter

Welty, Daniel

Graduate, Kinesiology & Recreation

Mentor

Prof. Noelle Selkow

**Objective:** To better understand the stereotypes, both positive and negative, of the athletic training profession from the perspective of athletic training students and nursing students. **Setting:** Online survey Subjects: Athletic training students and nursing students participated in this study. Participants must have been enrolled in their respective professional program and participants were excluded if they were already a licensed professional or attended another institution. **Data Collected and Analyzed:** Using the Health Team Stereotype Scale (HTSS), a 54 pair bipolar adjective survey, athletic training students and nursing students completed the HTSS for how the participant perceived the profession of athletic training. Demographics from each participant were also collected. **Results:** Data collection is in progress. We hypothesized that more positive stereotypes would come from the athletic training students then from the nursing students regarding the profession of athletic training.



# WILL MINDFULNESS EDUCATION SUPPORT SOCIAL AND EMOTIONAL LEARNING (SEL) STANDARDS IN THE CLASSROOM?

Presenter

Wheeler, Kaitlin

Graduate, Social Work

Mentor

Prof. Kathryn Conley Wehrmann

Authorship

Kaitlin Wheeler

The state of Illinois Public Act 93-0495 calls upon the Illinois State Board of Education (ISBE) to develop and implement a plan to incorporate social and emotional development standards as part of the Illinois Learning Standards. As such, ISBE has developed and articulated Social and Emotional Learning (SEL) competencies and standards for Pre-K through grade 12. Children in Illinois are expected to be working toward three SEL goals, which align across all grade levels. Despite having universal competencies and standards for SEL education, it is still the responsibility of school administration to decide how SEL education will be incorporated into the classroom. This agency allows different schools and districts to evaluate which SEL curriculum's work best for their demographic, size, and budget. Conversely this freedom limits some schools and districts due to lack of access to curriculum options, funding, and ability to train educators in curriculum implementation.

This project focuses on answering the question of "will mindfulness education support Social and Emotional Learning (SEL) Standards in the classroom?" through the implementation and evaluation of mindfulness education in a 3rd grade classroom at Lexington Elementary School. Mindfulness education was selected as an option for meeting SEL standards due to the evidence suggesting effectiveness in many schools nationwide, as well as being a low-cost option. The curriculum will be delivered in 20 sessions over the course of 10 weeks, with sessions being conducted 2x weekly for 15 minutes each. Student participants will complete the Self-Description Questionnaire pre and post assessment, as well as a curriculum evaluation post assessment. The classroom teacher will complete the Classroom Educator Questionnaire which measures how effective the classroom teacher feels the mindfulness education Curriculum was at meeting the various facets within the three SEL goals. The Self-Description Questionnaire will measure improvements in student's perception of their ability to self-regulate, express themselves, and learn in the classroom. The results from all measures will be analyzed for common themes and improvement in order to determine if mindfulness education is an option for meeting SEL standards in the classroom.

# TEACHER PREPARATION FOR TEACHING STEM TO ALL STUDENTS

Presenter

White, Mandy

Graduate, Special Education

Mentor

Prof. Yun-Ching Chung

STEM (Science, Technology, Engineering, and Mathematics) has emerged as an instructional approach in the content areas. As teacher preparation programs begin to prepare teacher candidates to deliver the STEM instruction, practicing teachers have implemented a variety of approaches that integrated STEM in their classrooms. The purpose of this research synthesis is to address the following questions: (a) How are pre-service teachers prepared to include all students in STEM education? (b) How do practicing teachers implement STEM in classrooms (c) To what extent are students with disabilities included in STEM teacher preparation and classroom implementation? I identified themes related to STEM implementation, teacher preparation, and special education. Findings showed that STEM has been integrated from kindergarten through university classrooms, as an isolated subject or with a multidisciplinary approach. Across colleges, the approaches to prepare pre-service teachers to teach STEM differ substantially. In addition, students with disabilities have gained more access to STEM learning through universal design and the arts. I will discuss recommendations and implications for teacher preparation programs.

# THE RELATIONSHIP BETWEEN MICRO EXPRESSIONS AND EMPATHIC CAPACITY

|            |  |
|------------|--|
| Presenter  | Woolard, Dustin<br>Undergraduate, Psychology |
| Mentor     | Prof. Suejung Han                            |
| Authorship | Suejung Han; Amanda Martin; Alexa Fischer    |

The ability to understand others' emotions accurately is one of the core competences for counseling psychologists. In particular, the ability to keenly observe subtle expressions that can reveal how people authentically feel is essential (Ekman, Matsumoto, Friesen 1997), since they may be masked by other emotions that they consciously present contrary to what they might be feeling (Greenberg, 2010). Thus, it is crucial to examine predictors of the ability to read micro expressions in finding ways to promote it. This study proposes the empathic capacity as such a predictor. Previous studies have showed that individuals with higher levels of empathy were able to make successful imitations of facial expressions (Williams et al., 2013) and recognize facial expressions of emotions better (Balconi & Canavesio, 2016). This study examined the association between the trait of empathic capacity and the ability to read micro expressions of emotions.

College Students enrolled at a Midwestern University will be recruited to participate in the study through the research participation management system with course credits. They will complete a self-report measure of the Empathy Quotient (Baron-Cohen & Wheelwright, 2004) and a computerized micro expression task (Paul Ekman Group, 2003). A simple regression analysis will be used to test the hypothesis. We are currently seeking IRB approval. The complete results and implications for counseling psychology will be presented at the conference.

# EFFECT OF AN INJURY PREVENTION CLASS ON THE INCIDENCE OF INJURY IN US ARMY ROTC CADETS

|            |  |
|------------|--|
| Presenter  | Wooldridge, Joshua<br>Graduate, Kinesiology & Recreation |
| Mentor     | Prof. Noelle Selkow                                      |
| Authorship | Joshua Wooldridge; Todd McLoda; Noelle Selkow            |

**Introduction:** Musculoskeletal injuries are the leading health concern for the United States Army. These injuries are the third leading cause of hospitalizations for Army service members and the primary cause for the majority of service-connect disability discharges. Over 80% of musculoskeletal injuries are overuse injuries caused by physical training. The Joint Services Physical Training Injury Prevention Work Group considers education to be a mandatory component of all injury prevention efforts; however, little military research has investigated the impact of education as a primary intervention.

**Objective:** To examine the effect of an injury prevention education class on the incidence of injuries in Reserve Officers' Training Corps (ROTC) cadets.

**Methods:** A quasi- experimental study design using a historic control group. Seventy-nine ROTC cadets (age:  $20 \pm 2$  years, body mass:  $73.57 \pm 12.60$  kg, height:  $172.88 \pm 9.50$  cm) during the Fall 2018 academic semester provided informed consent to participate in the study. Cadets within the same program from the previous fall semester served as the historic control group. A one hour and 15-minute injury prevention class covering physiology of overuse injuries, common risk factors, and recommended interventions was taught to the cadets at the start of the semester. A second, 45-minute class on modifications to physical training was taught to those cadets in leadership roles. Injury data on any cadets that suffered an injury during both semesters were collected from athletic trainers working with the ROTC program.

**Results:** No change in the number of injuries existed between the control and intervention groups. Chi square tests of independence were performed between the two groups based on the nominal categories of body region injured, sex of the injured cadet, and whether the injury was caused by acute or cumulative trauma. No statistical significance between the groups was found based on body region injured ( $\chi^2 (9) = 9.38, p = 0.403$ ) or sex ( $\chi^2 (1) = 2.78, p = 0.095$ ). A statistically significant difference existed between the two groups based on the type of injury ( $\chi^2 (1) = 3.89, p = 0.049$ ).

**Conclusion:** The results of this study demonstrated no impact of injury prevention education as the sole intervention on the incidence of injuries in ROTC cadets. This corroborates previous research suggesting that education is effective as a component of a multi-factorial intervention but not as the sole intervention. Unexpectedly, a shift in primarily overuse injuries to primarily acute injuries did occur, warranting further research on this topic.

# **WILL RESIDENT PARTICIPATION IN GROUP REMINISCENCE THERAPY CORRELATE WITH ENGAGEMENT OF RESIDENTS IN PRE-EXISTING ORGANIZATIONAL ACTIVATES?**

|            |   |
|------------|---|
| Presenter  | Workman, Matthew<br>Graduate, Social Work |
| Mentor     | Prof. Kathryn Conley Wehrmann             |
| Authorship | Matthew Workman                           |

The portion of American's who are over the age of 85 is the fastest growing age demographic in the United States. Long term care facilities are becoming an ever growing market that aims to provide housing and medical services to those who require assistance completing activates of daily living. In addition to providing housing, and medical care, long term facilities in Illinois are required to provide meaningful opportunity for social engagement for their residents. Facilities are required by law to provide a set number of activities for their residents, however many residents choose not to engage in the activities provided through the LTC facility. In order to better serve the aging population, further research into aiding residents in developing social behaviors is need.

This study purposes an intervention model utilizing reminiscence therapy. Residents of a rural Midwest assisted living facility will be recruited on an at- will basis to participate in an 8 week group therapy session where they will be encouraged to recall and share their significant experiences with their fellow group members with the intention of finding new meaning and purpose to their current situation. It is anticipated that participating in the re-authoring of the participants' life narrative in a group setting, group members will be able to connect with one another more easily and result in greater feelings of connectedness and social behaviors at the facility. This will be measured by residents' attendance at facility sanctioned activities and through self-report loneliness measure using the UCLA revised loneliness scale.

# A COMPARATIVE STUDY OF PARENTS' INTENTIONS TO ALLOW YOUTH HOCKEY AND YOUTH FOOTBALL PARTICIPATION

|           |                                    |
|-----------|------------------------------------|
| Presenter | Yonkee, Robert                     |
|           | Graduate, Kinesiology & Recreation |
| Mentor    | Prof. Michael Mulvaney             |

Large numbers of youth in the United States participate in hockey and football. Youth hockey and football programs aim to provide children opportunities for physical, social, and educational growth. In terms of physical effort and contact, hockey and football display similar characteristics. According to the American Academy of Pediatrics, hockey and football are both categorized as collision sports that involve athletes exerting great force to purposely hit or collide with other athletes and/or inanimate objects. Despite their similarities, youth football participation numbers have shown a nationwide decrease over the past decade while youth ice hockey participation numbers have shown an increase in the United States and Canada over the past decade. The growing concerns over head injuries has been noted as the most prominent reason for the decline in youth football participation numbers as a majority of the research has focused on football athletes. Responding to these trends, the purpose of this study was to examine parents' differing perceptions of risk between youth hockey and youth football participation. Further understanding parents' perceptions of risk and awareness between these two sports can provide a valuable framework to help build intervention tools and improve youth sport programming. A web-based survey was developed and distributed to 550 parents in the Town of Normal. A modified version of Murphy, Askew, and Sumner's (2017) parents' intentions to allow youth sport participation instrument was used to measure the variables of interests. Variables of interest included: intent to play (youth hockey and football), attitudes toward youth sport participation, perception of concussion risk, concussion knowledge, and demographics. T- tests, correlations, and regression analyses yielded significant findings across multiple variables suggesting parents have differing perceptions of risk associated with youth football and hockey participation. Complete findings are presented.

# ACQUIRING WISDOM THROUGH SCEPTICISM

Presenter

Yousef, Maisam

Undergraduate, Biological Sciences

Mentor

Prof. Daniel Breyer

Wisdom gives people insight into how to find peace and truth. This concept comes both through experience and knowledge and it's a process that can be attained throughout life. One of the ways wisdom can be acquired is through scepticism. Scepticism springs the seed of doubt in what we encounter in our daily lives. I will be going what wisdom and scepticism is and how wisdom can be acquired through concepts like scepticism.

# 2019 Symposium

## Morning Group Presentations

### **VISUAL SCENE DISPLAYS FOR EARLY INTERVENTION AUGMENTATIVE AND ALTERNATIVE COMMUNICATION**

|               |   |
|---------------|---|
| Group Leader  | Banks, Marlllys<br>Undergraduate, Communication Sciences and Disorders  |
| Group Members | Jassica Durek, Undergraduate, Communication Sciences and Disorders; Kathryn Judy, Undergraduate, Communication Sciences and Disorders; Ashleigh Tira, Undergraduate, Communication Sciences and Disorders |
| Mentor        | Prof. Ciera Lorio   |
| Authorship    | Marlllys Banks; Jassica Durek; Kathryn Judy; Ashleigh Tira; Ciera Lorio   |

Children with complex communication needs often benefit from the use of augmentative and alternative communication (AAC) systems. AAC systems include strategies and procedures that support children in using aided and/or unaided symbols for functional and effective communication. Visual scene displays (VSDs) are a type of AAC system and can be embedded on to common portable devices such as iPads, tablets, or even smartphones, making it easily accessible. Speech-language pathologists are increasingly using VSDs to address early language and communication deficits in young children, and research on VSDs has expanded in the last decade. To learn more about VSDs, a group of undergraduate students in Communication Sciences and Disorders reviewed the literature to determine how and why VSDs are used to promote language development in young children with complex communication needs. This poster summarizes the literature on VSDs and describes a learning module the students are developing to introduce caregivers to AAC systems and VSDs. Screenshots of the module and a discussion of how the module might be used in practice will be discussed.



## **PATIENT SATISFACTION SCORES FROM RATING WEBSITES FOR PHYSICIAN SPECIALTIES AT SELECT ILLINOIS HOSPITALS**

|               |  |
|---------------|--|
| Group Leader  | Beck, Brian<br>Undergraduate, Health Sciences  |
| Group Members | Quentin VerDermay-Kirkham, Undergraduate, Health Sciences; Brian Neumann, Undergraduate, Health Sciences |
| Mentor        | Prof. Jennifer Peterson  |
| Authorship    | Brian Beck; Brian Neumann; Quentin VanDermay-Kirkham   |

Patients are starting to use online physician ratings and comments from online resources to choose their doctor instead of the physician's qualifications. The purpose of the study was to compare the patient reviews of physicians between different physician specialties of three hospital types; one large (Northwestern Memorial Hospital), one medium sized local (Advocate Bromenn Medical Center), and three critical access hospitals (John Warner Hospital, Advocate Eureka, and Kirby Medical Center). The audit team selected hospitals from three different demographics. Due to critical access hospitals' limited staff, only data from the specialty family/internal medicine was collected, and multiple hospitals were used to fill this category. The audit team used the selected hospitals' websites to find ten physicians from six different specialties. The three rating sites that were selected were then used to search for the selected physicians by name. Physicians were identified in the search results by name, location and specialty to ensure the correct physician was identified. Searches yielding ratings for the physicians were recorded in tables created by the audit team. The ratings for each physician were averaged to give each physician one overall rating. These ratings were then averaged to give each hospital's specialty an overall average rating. The average ratings for the specialties were then averaged with the other hospitals for comparison between specialties. The average of all the specialties set the standard benchmark for assessment. This report summarizes the physician ratings for different specialties and highlights their average online rating standing.

# IDENTIFICATION OF PUBLISHED AUDIOLOGY CASE REPORTS IN A GENERAL AND HIGHLY-SPECIFIED SEARCH

|               |   |
|---------------|---|
| Group Leader  | Belke, Hannah<br>Undergraduate, Communication Sciences and Disorders  |
| Group Members | Natalie Rothbauer, Graduate, Communication Sciences and Disorders; Clara Marchini, Graduate, Communication Sciences and Disorders |
| Mentor        | Prof. Antony Joseph   |
| Authorship    | Hannah Belke; Natalie Rothbauer; Clara Marchini; Antony Joseph  |

Case reports, case studies, and case series were once a common publication in the literature and were used principally to train medical residents and physicians how to master the art of reporting. Comparatively, in audiology, case reports, case studies, and case series have demonstrated a lower utilization rate. Hence, to quantify the rate of case reports specifically written about audiology patients and published in audiology journals between 1970 and 2018, we conducted a comprehensive literature search. Our search term yield was recorded and tested in three major academic databases (ComDisDome, CINAHL plus, and PubMed). We then filtered the citations obtained from our high-level search to identify the rate of case report publications that occurred in audiology journals. Our primary discovery was that most published case reports written about audiology patients may be found in medical and surgical otology journals, but significantly less found in audiology journals. This disparity likely reduces the accessibility of cases reports for audiologists because they typically consume audiology journals.

Clinical case reports, case studies, and case series may provide a detailed exposition of patient symptomology, diagnosis, prognosis, and treatment, which may inform best-practices and outcomes in audio logic health care. Case reports may ultimately promote higher patient satisfaction and collaboration between providers so we recommend that more case reports be written for audiology publications.

Key words: Case reports, case studies, case series, audiology, auditory, vestibular

# ROLE-DIFFERENTIATED BIMANUAL MANIPULATION DIFFERENCES IN EFFICIENCY AMONGST DIFFERENT HANDEDNESS GROUPS

|               |  |
|---------------|--|
| Group Leader  | Cortina, Sarai<br>Graduate, Psychology   |
| Group Members | Rachel Flores, Graduate, Psychology; Leanne Mordan,<br>Undergraduate, Psychology                   |
| Mentor        | Prof. Julie Campbell   |
| Authorship    | Sarai M. Cortina; Rachel Flores; Leanne Mordan; Kevin Gehm;<br>Julie M. Campbell; George F. Michel |

Role-differentiated bimanual manipulations (RDBMs) are a complex action in which two hands, each performing a different task, work together to accomplish a mutual goal (Babik & Michel, 2015). RDBMs can be used as an indicator of hemispheric specialization for hand preference, and hand preference has been implicated to have an impact on a host of cognitive abilities (Michel, 2017). Hand preference for acquisition and hand preference for RDBM have previously been shown to be related, as infants prefer to use their ipsilateral hand for performing both of these actions (Babik & Michel, 2015).

The goal was to examine the relation of hand preference to RDBM efficiency, which is defined as the speed of an infant successfully completing a RDBM action. Thirty (10 right-handed for acquisition, 10 left, and 10 no preference) infants' (20 males) videos were derived from archived data from a larger longitudinal study. Videos were examined for the time taken to successfully complete simple and difficult RDBM actions. The start time was indicated by the infant's initial contact with an object and stop time was indicated by successful completion of a RDBM action.

A two-way ANOVA revealed a difference in performance time between the 9 month RDBM performance times and each of the other months of testing, indicating that RDBM speed increased across time. Infants with a left acquisition hand preference ( $M= 6.14$ ) performed RDBMs significantly faster than infants with a late right preference ( $M= 7.64$ ).

## A SEARCH FOR EVIDENCE OF GENDER-RELATED HEARING LOSS

|               |  |
|---------------|--|
| Group Leader  | Davis, Toryn<br>Undergraduate, Communication Sciences and Disorders  |
| Group Members | Emily Ferguson, Undergraduate, Communication Sciences and Disorders; Natalie Rothbauer, Graduate, Communication Sciences and Disorders; Clara Marchini, Graduate, Communication Sciences and Disorders |
| Mentor        | Prof. Antony Joseph  |
| Authorship    | Toryn Davis; Emily Ferguson; Natalie Rothbauer; Clara Marchini; Antony Joseph  |

The aim of this project was to determine whether evidence of gender-related hearing loss could be found in the literature. In the Occupational Safety and Health Administration Table (F-1, F-2), it is apparent that female audiometric thresholds are dissimilar to male listeners; however, the human population used to produce these tables may not represent female and male hearing today. To identify factors that might contribute to differences between male and female hearing, we conducted a literary review of the medical literature specifying search terms that pertained to this topic. For relevant citations discovered from the literature search, it became apparent that hearing loss was more prevalent in male subjects than females. Physical differences between females and males may account for some of the reported gender disparities in studies about hearing loss. Gender differences were also identified in electrophysiology data. Occupationally, males are exposed to more excessive noise-hazardous working conditions than women, which contributes to increased auditory injury, hearing loss, and communication disorders. More research is needed in order to fully understand each of the significant differences that contribute to hearing loss in males and females.

Key words: Female, male, gender; hearing loss; auditory, differences

# MEASURING FACEBOOK ENGAGEMENT VALENCE AGAINST ELECTION OUTCOMES IN THE 2018 GUBERNATORIAL ELECTIONS

|               |  |
|---------------|--|
| Group Leader  | Drew, Derek<br>Graduate, Communication   |
| Group Members | Amina Jinadu, Undergraduate, Communication; Rebecca Bromann, Graduate, Communication; Marineth Sierra, Graduate, Communication; Emily Long, Undergraduate, Communication; Sara Engstrom, Communication; Hunter Smith, Undergraduate, Communication |
| Mentor        | Prof. Nathan Carpenter   |
| Authorship    | Derek Drew; Marineth Sierra; Amina Jinadu; Emily Long; Rebecca Bromann; Sara Engstrom; Hunter Smith  |

On November 6, 2018, 36 states held gubernatorial elections and every major candidate in these elections used a Facebook page in support of their campaigns. Social media platforms such as Facebook have played an increasingly important role in reaching constituents and potential voters. Candidates in the 2018 midterm elections spent millions of dollars to saturate Facebook with their messages. Political campaigns are not the only contributors to Facebook content. Even as campaign messages are disseminated to a mass audience, individuals have the ability to comment on these pages which have the potential to also be seen by a mass audience. These messages, both from the campaign and from the users who comment on them, have the potential to influence perception about the candidates running for office.

Using Netvizz, a research application for Facebook, we collected Facebook engagement data and publicly-available comments for the top two candidates in each 2018 gubernatorial election, 72 Facebook pages in total. We then used the Syuzhet sentiment analysis package for R to code the overall positivity and negativity of the campaign pages' posts and the public comments on each page. Next, we examined the publicly-available engagement data from each post on each campaign Facebook page, sorting them into positively- and negatively-affiliated categories. Finally, we conducted topic modeling each campaign page's posts to determine the overall themes and topics discussed.

From the results of these analyses, we ask the following questions: to what extent does the overall tone of campaign messaging correlate with election results? To what extent does the overall tone of the comments on campaign pages correlate with election results? Do other forms of engagement such as likes, reactions, and shares correlate with election results? Finally, to what extent do the themes or topics discussed by the campaigns have bearing on the election results?

We anticipate this study to expand understanding of the role Facebook plays in American politics, especially as it relates to the overall tone and sentiment of political discourse.

# ASSESSING IMPLEMENTATION OF SCHOOL-WIDE SOCIAL AND EMOTIONAL LEARNING EFFORTS

|              |   |
|--------------|---|
| Group Leader | Flores, Rachel<br>Graduate, Psychology                  |
| Group Member | Caroline Signa, Undergraduate, Psychology               |
| Mentor       | Prof. Adena Meyers                                      |
| Authorship   | Rachel Flores; Caroline Signa; Adena Meyers; Abby Lyons |

School-based social and emotional learning (SEL) programs have been shown to increase children's prosocial behaviors and decrease conduct-related and internalizing problems (Durlak et al., 2011), with long-term benefits in problem solving, self-regulation, relationship skills, and academic performance (Durlak et al., 2017). These effects may be strengthened or weakened depending on how well programs are implemented (Durlak, 2015). The Collaborative for Academic, Social and Emotional Learning (CASEL) developed a Theory of Action of SEL Implementation to guide school systems' efforts to implement SEL programs. This study examined a Midwestern school district's initial efforts to implement a school-wide approach to SEL in two pilot elementary schools.

**Procedure:** During the 2018 fall quarter, teachers (n=129) from the two pilot schools and two comparison schools in the same district completed the CASEL-AIR Staff Survey of SEL Implementation, which assesses six constructs derived from CASEL's Theory of Action, including: 1) developing a vision; 2) assessing needs and resources; 3) professional learning; 4) implementation; 5) school-wide integration; and 6) continuous improvement. In addition, the scale includes three item clusters that assess constructs of interest apart from the theory of action, including: 1) development of staff commitment for SEL; 2) classroom SEL practices; and 3) district-level SEL practices (Osher et al., 2015).

**Results:** Significant differences in the expected direction between pilot and comparison schools were observed for five theory-of-action constructs, with a marginally significant difference for the sixth construct. Significant differences were also observed on two of the three item clusters, with pilot teachers using more classroom SEL practices (such as guided inquiry and cooperative learning) but reporting lower levels of commitment to SEL promotion and instruction relative to comparison teachers. There were no differences in ratings of district-level SEL practices. (See Table 1).

**Conclusions and Implications:** Overall, results suggest that even during the early months of implementation, teachers in pilot schools are endorsing key theory-of-action constructs to a higher degree than are teachers in comparison schools. Nevertheless, pilot teachers report lower levels of commitment to SEL promotion and instruction than do comparison teachers. This may reflect the fact that more is being asked of teachers in pilot schools. It suggests that efforts to build teacher commitment and buy-in should be an important area of focus for the pilot project moving forward. Implications of the findings for understanding factors influencing SEL implementation will be discussed.

## SIP-TIP CUP FOR PATIENTS WITH DYSPHAGIA

|               |  |
|---------------|--|
| Group Leader  | Genzel, Kaylee<br>Undergraduate, Communication Sciences and Disorders  |
| Group Members | Carly McClernon, Undergraduate, Communication Sciences and Disorders; Monika Krzywosz, Undergraduate, Communication Sciences and Disorders |
| Mentor        | Prof. Taeok Park   |
| Authorship    | Monika Krzywosz; Carly McClernon; Kaylee Genzel; Taeok Park  |

Liquid intake can be challenging for individuals with dysphagia. These individuals are not able to control the amount of bolus or are not able to place the bolus in the oral cavity. The compensation management is used for patients with difficulty of liquid intake such as, changing the feeding method. The purpose of this study was to investigate feeding tools for liquid intake in patients with dysphagia. The Sip-Tip cup is a compensatory feeding tool that we selected after researching various tools for individuals with dysphagia. The entire lifespan can benefit from this cup and can provide them with more confidence in liquid intake. This tool is versatile because of its many advantages. For example, patients are able to have control over the quantity of liquid consumed and remain in an upright position. Additionally, this tool helps patients with weak buccal pressure to use a straw. Compensatory feeding tools versatility and ease of use will allow individuals to enjoy drinking liquids safely.

## **SOCIOSEXUALITY AND HIGHER EDUCATION: HOW SEXUALLY ACTIVE ARE COLLEGE STUDENTS?**

|               |  |
|---------------|--|
| Group Leader  | Gray, Samantha<br>Undergraduate, Sociology/Anthropology  |
| Group Members | Alexis Swanson, Undergraduate, Sociology/Anthropology; Sergei Deptula, Undergraduate, Sociology/Anthropology; Maia Cain, Undergraduate, Sociology/Anthropology; Bryce Canary, Undergraduate, Sociology/Anthropology; Joshua Espinoza, Psychology; Hailie Halverson, Undergraduate, Psychology; Mary Mulligan, Undergraduate, Sociology/Anthropology; Angela Yonan, Undergraduate, Sociology/Anthropology |
| Mentor        | Prof. Susan Sprecher   |
| Authorship    | Samantha Gray; Alexis Swanson; Maia Cain; Sergei Deptula; Joshua Espinoza; Angela Yonan; Mary Mulligan; Bryce Canary; Hailie Halverson   |

Many years ago, Gangestad and Simpson (1990) created a Sociosexual Orientation Inventory (SOI) to measure individual differences in willingness to engage in casual, uncommitted sex. The scale measures past sexual behavior, expectation for future sexual behavior, and attitudes toward engaging in casual sex. People with a high score on the SOI have an unrestricted sociosexual orientation, and those with a lower score have a more restricted sociosexual orientation. Considerable research has been done to examine demographic variables associated with scores on SOI. As one example, and based on data collected at Illinois State University, Sprecher, Treger, and Sakaluk (2013) analyzed data collected in a sociology class over a 23-year period to examine not only cohort differences but also differences based on gender and ethnicity. The main findings from the study were that men had more unrestricted socio-sexuality than women. It was also discovered that ethnicity played a role in sexual permissiveness in men (with black men being more permissive than white, Hispanic, and Asian men) but no ethnic differences were found for women.

We are extending that prior research by conducting secondary data analysis on the same large data set (over 7,000 individuals) to examine how other demographic characteristics (e.g., plans for education, parental divorce status) are associated with SOI scores. We expect to find that those who have higher educational aspirations will have lower SOI scores than those who do not plan on continuing their education. Also, we expect to find that a high grade-point average (GPA) is associated with a low SOI score. Additionally, we would like to examine whether socioeconomic status is associated with one's sexual permissiveness. Preliminary analyses have been conducted, and an example finding is that SOI scores are not correlated with plans for education, but they are negatively correlated with GPA. Thus, those who have better grades score lower on the SOI scale. More findings will be presented in the poster.



## **CONCUSSION AWARENESS: KNOWLEDGE AND PREVENTION IN ADOLESCENCE**

|              |  |
|--------------|--|
| Group Leader | Gregory, Lauren<br>Undergraduate, Communication Sciences and Disorders |
| Group Member | Natalie Carlisle, Undergraduate, Communication Sciences and Disorders  |
| Mentor       | Prof. Jamie Smith  |

There is a lack of awareness regarding concussions sustained in children, including how they should be managed and the long term risks associated with them. There are also discrepancies in decisions regarding the diagnosis and treatment of concussions in school-aged children. This project included a review of the literature on pediatric head injury coupled with interview data from professionals who work with children who sustain head injuries. This poster will describe what a concussion is, review some of the available diagnostic tests, briefly summarize state laws regarding concussion management, and provide an overview of best practice in the aftermath of a potentially severe pediatric head injury.

# INTEGRIN SIGNALING MEDIATES SELF-TOLERANCE IN DROSOPHILA IMMUNITY

|                        |   |
|------------------------|---|
| Group Leader           | Gunawan, Eva<br>Graduate, Biological Sciences                                 |
| Group Member<br>Mentor | Jessica Burkhart, Undergraduate, Biological Sciences<br>Prof. Nathan Mortimer |
| Authorship             | Eva Gunawan; Jessica Burkhart; Victoria DeMichel; Nathan Mortimer             |

Autoimmune disorders such as Systemic lupus erythematosus (SLE) affect hundreds of thousands each year. These autoimmune diseases often occur because of an inability of the immune cells to differentiate self-tissues from foreign pathogens. This failure in self-recognition leads to the stimulation of immune responses targeting the individual's own tissues, leading to a range of symptoms and even causing life-threatening conditions. Despite research into the causes of autoimmune disorders, the role of innate immune responses in autoimmunity remains unclear. To elucidate the mechanisms that drive autoimmunity, we are investigating SLE in *Drosophila melanogaster*. *Drosophila* have no adaptive immune response but do have a highly conserved innate immune system that mirrors that of humans. To look at autoimmune mechanisms, we are using *Drosophila tuSz* mutants. These mutants have overactive immune cells and have lost the ability to differentiate between pathogen and self, leading to the production of self-directed immune responses. We have found that protein glycosylation of extracellular matrix (ECM) proteins serves as a self-signal, and the goal of our current research is to uncover the immune receptors that sense this signal. We hypothesize that Integrin receptors act as self-sensor cell receptors in *Drosophila*, and that they bind to glycosylated ECM proteins to suppress the self-directed immune response. By using *Drosophila* as a model to investigate the role of integrins in autoimmune signaling, we hope to understand how the innate immune system contributes to autoimmune disease.

# UNDERSTANDING ELEMENTARY TEACHER-STUDENT SPATIAL LANGUAGE DURING A GEOGRAPHIC INFORMATION SYSTEMS (GIS) LESSON

|              |  |
|--------------|--|
| Group Leader | Hernandez, Rosaury<br>Graduate, Psychology |
| Group Member | Barbara Miller, Undergraduate, Psychology  |
| Mentor       | Prof. Alycia Hund                          |
| Co-Mentor    | Prof. May Jadallah                         |
| Authorship   | Rosaury Hernandez                          |

Spatial thinking is a central component of science, technology, engineering, and mathematics (STEM) performance that can be improved with experience (Uttal et al., 2013). One powerful tool for boosting spatial skills is experience with Geographic Information Systems (GIS), which is a software designed to analyze geographical data in multiple layers (Fitzpatrick & Maguire, 2000). Previous research has shown that the implementation of GIS with high school students improves their ability to solve community problems (Kersi et al., 2013). Spatial skills also increase in middle school students who participate in GIS activities (Baker & White, 2003). Importantly, Jadallah et al. (2017) documented improvement of spatial thinking among elementary students with GIS training. Teachers led lessons using the Quantum GIS program in which students used geoprocessing tools to manipulate spatial maps and solve problems. Elementary students showed gains in spatial skills following GIS lessons relative to standard social studies lessons. An important next step is to understand how GIS lessons might improve spatial skills. One potential mechanism is spatial language during classroom interactions. The goal of our naturalistic observation was to understand the role of spatial language in elementary students and their teachers while engaged in GIS lessons. We focused on one GIS lesson completed over 18 social studies class periods in three fifth grade classes in an urban, under-resourced school district. The goal of the lesson was to find the best location to plant a new tree on the state capitol grounds (adapted from Jadallah et al., 2017). Classroom discourse was transcribed verbatim. We used a spatial language coding system to quantify spatial language, including locations, spatial dimensions, continuous amount, deictics, spatial features, shapes, patterns, and orientations (Cannon et al., 2007). We also coded GIS and geography words. Spatial language accounted for 9.35% of teacher language and 9.60% of student language. Overall, GIS words—such as geoprocessing, layer, buffer, union—were the most frequently used spatial words among teachers (3.13%) and students (3.53%). Locations and directions—such as far, near, down—were the next most frequent category (2.26% and 2.36%), followed by deictics such as here, where (1.24% and 1.09%), continuous amounts (.59% and .66%), and spatial dimensions (.36% and .32%) for teachers and students, respectively. Patterns, shapes, geography words, spatial features, and orientations were quite infrequent for teachers and students. Our findings confirm that spatial language is an important part of elementary classroom discourse.

## CONTRAST AND CONTINUITY IN THE REIGNS OF IRENE (775-811CE)

|                        |   |
|------------------------|---|
| Group Leader           | Janicki, Logan<br>Undergraduate, History                          |
| Group Member<br>Mentor | Andrew Pfannkuche, Undergraduate, History<br>Prof. Kathryn Jasper |
| Authorship             | Logan Janicki; Andrew Pfannkuche                                  |

Andrew Pfannkuche's and I's research focused on the often-overlooked Empress Irene. Specifically, we looked to apply emerging digital methods to one of the most significant sources of information on her reign- Theophanes' Chronographia. Other Byzantinists have suggested that Irene's reign marked a turning point in which Imperial favor moved away from the Iconoclast army and towards the Iconophile clergy and bureaucracy. Our research therefore aimed to test this claim; our hypothesis being that if such a change occurred, a geographic shift in the focus of Theophanes' narrative should be present and able to be mapped. Borrowing much of our methodology and data from Dr. Torgerson (of Wesleyan University) and his team's ongoing research, we collected and organized geographic data from Theophanes' text. This was used to create the maps which our analysis hinges on. In total we created 7 different maps, documenting the reigns of Leo IV through Nikephorus I, giving us data on an emperor to each side of Irene, so as to see how drastically she changed imperial policy, and how well those changes stuck. Sadly, our maps did not particularly allow for direct viewing of the administrative changes occurring under Irene, rather we saw their effects on the direction of Imperial policy. For example, it showed the Byzantine army was capable of carrying out offensive campaigns earlier than it is generally credited for. Irene's time on and around the throne would see this reinvigorated army turned towards the West. Theophanes' narrative implies this change was not merely military, as the Franks and Papacy gain new importance as well. Analysis of Nikephorus' reign according to Theophanes shows that (despite Theophanes' evident distaste for the man) he mostly held to Irene's new policy directions.

# ASYNCHRONOUS DISCUSSIONS TO ENGAGE STUDENTS IN SCIENTIFIC ARGUMENTATION

|                        |  |
|------------------------|--|
| Group Leader           | Jayasinghe, Iresha<br>Graduate, Biological Sciences                                    |
| Group Member<br>Mentor | Ranija Turner, Undergraduate, Biological Sciences<br>Prof. Rebekka Darner              |
| Co-Mentor              | Prof. James Wolf   |
| Authorship             | Iresha Jayasinghe; Ranija Turner; Kristine Callis-Duehl; James<br>Wolf; Rebekka Darner |

Scientific argumentation is a practice of knowledge building which bridges claims and evidence. It plays an important part in understanding and execution of scientific knowledge (Duschl & Osborne, 2002) and is considered as one of the primary goals in science education (NRC, 2007). Online discussion boards are becoming a common way to engage students in scientific argumentation. However, few studies of scientific argumentation in online environments have been conducted. This study examines scientific argumentation occurring in an asynchronous online discussion board to answer the questions: 1. Does gender composition of discussion groups affect students' engagement in productive scientific argumentation? 2. To what extent does gender composition of groups engaging in scientific argumentation influence the development of scientific literacy? 3. To what extent does gender composition of discussion groups and the quality of scientific argumentation affect students' satisfaction with the discussion experience? Participants were recruited from an online introductory biology course taught at a large R2 university in the Midwest United States during the summer of 2018. Students were placed in discussion groups that remained throughout the 6-week course. Groups were assembled according to three gender treatments: all-male (2), all-female (6), mixed-gender (5). At the beginning of the course, students' scientific literacy was measured using 10 items from the TOSLS (Test of Science Literacy Skills; Gormally, Brickman, & Lut, 2012). Discussions occurring in week 5 of the course were downloaded, de-identified, and coded using the ASAC (Assessment of Scientific Argumentation in the Classroom) protocol (Sampson, Enderle, & Walker, 2012) to measure the quality of scientific argumentation. At the end of the course, 10 different but matched items from the TOSLS were administered, along with a survey of students' satisfaction with their discussion experiences. A one-factor analysis of variance (ANOVA), using group composition to predict ASAC score, was performed to address the first research question. A repeated-measures ANOVA was used to assess the influence of group composition on pre/post-course growth in scientific literacy, measured by the TOSLS items, to answer the second research question. A two-factor ANOVA, using group composition and ASAC scores to predict satisfaction scores, was performed to answer the last research question. Results obtained from this project assist in understanding scientific argumentation in an online environment, particularly how gender composition of groups influences the quality of scientific argumentation and students' satisfaction with discussion experiences. This study opens doors for novel curricula and improved online science education.

# THE RELATIONSHIP BETWEEN PARENT-CHILD ATTACHMENT RELATIONSHIP QUALITIES, SELF-REGULATION, AND PEER ACCEPTANCE DURING THE PRESCHOOL

|               |   |
|---------------|---|
| Group Leader  | Keating, Samantha<br>Undergraduate, Psychology  |
| Group Members | Megan Stevens, Undergraduate, Psychology; Kristina Wiemer, Undergraduate, Psychology; Michaela Pierson, Undergraduate, Psychology |
| Mentor        | Prof. Alycia Hund   |
| Co-Mentor     | Prof. Jessie Lucas-Nihei  |
| Authorship    | Samantha Keating; Megan Stevens; Kristina Wiemer; Michaela Pierson; Jessie Lucas-Nihei; Alycia Hund                               |

In this study we focused on the quality of the relationship between a parent/guardian and their child and that same child's ability to self-regulate and be accepted by his or her classmates. Within the parent-child attachment relationship, closeness includes warmth and affection and conflict includes negativity (Driscoll & Pianta, 2011). Self-regulation refers to taking in information, weighing choices and consequences, and making adaptive choices to attain a particular goal. (McClelland et al., 2015). Peer acceptance represents the degree to which a child is well liked by peers, and it is a crucial component of the early childhood years (Ladd & Sechler, 2013). This claim has been tested in previous studies and has been chosen for replication because its findings are important in helping adults ensure children are receiving the necessary attachment for optimal growth. Specifically, it has been found that early secure attachment to parents enhanced positive peer relationships and academic competence (Wood, 2007). The goal of this study was to examine whether parent/guardian-child attachment relationship qualities, preschoolers' self-regulation, and peer acceptance are significantly related to one another. We also examined which child gender would be related to the degree of closeness to their guardian and child self-regulation. To date, 90 preschool-age children from 31 early childhood classrooms, 90 parent/guardians, and 29 lead classroom teachers have participated. Preschool children completed the self-regulation task of Head, Toes, Knees, and Shoulders. Parent/guardians were asked to complete a rating scale measuring the conflict and closeness experienced within the attachment relationship. Lead classroom teachers completed one rating scale measuring their perceptions of students' peer acceptance. Data collection is ongoing. Once our target sample size is reached, we will conduct correlation analyses to describe how parent-child attachment relationship qualities, preschoolers' self-regulation, and peer acceptance are related to one another. It is expected that parent-child attachment relationship qualities, preschoolers' self-regulation, and peer acceptance are significantly correlated. Specifically, we expect that closeness within the attachment relationship is positively correlated and conflict is negatively correlated with preschoolers' self-regulation and peer acceptance. We also predict girls to have stronger closeness relationship qualities with their guardian than boys. Therefore, we expect girls to be able to self-regulate more than boys at this age.

# THE RELATIONSHIP BETWEEN PHYSICAL ACTIVITY, PERCEIVED STRESS, AND HEART RATE VARIABILITY

|               |   |
|---------------|---|
| Group Leader  | Mahoney, Delaney<br>Undergraduate, Kinesiology & Recreation   |
| Group Members | Alex DiSerio, Undergraduate, Kinesiology & Recreation; Ayla Kibler, Undergraduate, Kinesiology & Recreation; Lauren von Shaumburg, Graduate, Kinesiology & Recreation; Nick Pilli, Graduate, Kinesiology & Recreation |
| Mentor        | Prof. Karen Dennis  |
| Co-Mentor     | Prof. Alex Wolfe  |
| Authorship    | Karen Dennis; Alex Wolfe; Ayla Kibler; Alex DiSerio; Delaney Mahoney; Nick Pilli; Lauren von Shaumburg  |

Heart rate variability (HRV) describes the time interval between heart beats. The sinoatrial node controls the rhythm of the heart, and is modulated by the sympathetic and parasympathetic systems. The continuous influence of these two systems results in variations in heart rate. During stress, the sympathetic nervous system is aroused, which appears in the form of lowered HRV. Previously, many studies have stated that as physical activity (PA) increases, heart rate decreases, while HRV increases. However, if HRV is impacted by stress, and physical activity can decrease stress, more research is needed to examine the relationship between physical activity, stress, and HRV. Methods: Eighteen exercise science students were fitted with a BodyMedia SenseWear Armband for one week, worn always except during showering or swimming. Subjects completed the State-Trait Anxiety Inventory for Adults to measure stress. Upon returning this monitor, HRV was measured using the HeartMath emWave pro software (HeartMath, LLC. Boulder Creek, CA). Results: See Table 1. Descriptive Statistics. There was a moderate-low negative relationship between stress and SDANN ( $r=-0.388$ ). As stress increased, HRV decreased. There was no real relationship between the number of steps daily and HRV ( $r=-0.049$ ). Total number of steps per day had a very low correlation ( $r=-0.287$ ) with stress. While not all subjects achieved the recommended 10,000 steps per day, they were still meeting, and exceeding, the 60 minutes of moderate intensity physical activity per day national recommendations, based on data retrieved from the SenseWear Armband. Further analysis revealed that number of minutes in moderate intensity physical activity had a stronger correlation to stress than total steps per day had to stress ( $r=0.062$ ). This current study found only a moderate, at best, correlation between HRV, Stress, and PA levels based on steps per day. Conclusions: This subject population (exercise science majors) tends to achieve minimum recommendations for moderate intensity physical activity. Possible explanations of these finding are that achievement of moderate intensity physical activity recommendations may have a greater influence on stress than total steps per day. Participation in moderate intensity physical activity or exercise, as the research has stated, can positively impact stress and anxiety.

# YOUNG CHILDREN'S UNDERSTANDING OF ORDINAL, SPATIAL, ALPHABET, AND COLOR LABELS IN A SPATIAL SEARCH TASK

|               |  |
|---------------|--|
| Group Leader  | Maydew, Morgan<br>Undergraduate, Psychology  |
| Group Members | Rebecca Bove, Undergraduate, Psychology; Alize DuBre-Scholz, Undergraduate, Psychology; Analeese Monla, Undergraduate, Psychology; Cody Heap, Graduate, Psychology |
| Mentor        | Prof. Alycia Hund  |
| Authorship    | Rebecca Bove; Alize DuBre-Scholz; Analeese Monla; Cody Heap; Alycia Hund   |

Preschool children demonstrate rapid gains in conceptual understanding and language comprehension. Understanding temporal and spatial ordering is important in everyday life, such as when completing instructions in order, understanding narrative sequences, and keeping track of locations in space. Recent research findings highlighted 4- and 5-year-old children's emerging ability to understand ordinal labels (e.g., first, second, third) to help them search for stickers hidden in toy train cars (Miller, Marcovitch, Boseovski, & Lewkowicz, 2015). The goal of this project is to replicate this work and to extend it in two important ways: (1) to extend the age range downward to 3 years to more fully understand the developmental trajectory, and (2) to compare the ordinal labels used by Miller et al. (2015) (first, second, third) to spatial labels (front, middle, back), alphabet labels (A, B, C), and color labels (red, green, yellow). To date, 248 3-, 4-, and 5-year-old children participated. They were familiarized with a toy train that included an engine, three identical cars (all black for the first three conditions or red, green and yellow for the color condition), and a caboose and with the labels used in their experimental condition. Then, the children completed six test trials where they heard the labels for the cars (depending on their condition) and tried to find a sticker hidden in the indicated car after it had been hidden from view. The proportion of correct searches was then calculated. Parents/Guardians were asked to complete a brief demographic survey and a language checklist to provide additional details about child language development. We expect that search performance will increase with age, especially for the most difficult spatial and ordinal conditions. We also expect that search performance will be related to parent reports of child language. These findings will provide important details about young children's understanding of ordinal and spatial language.



# THE PERFORMANCE OF NANOPARTICLE-MODIFIED PAPER SUBSTRATES EMPLOYED AS SURFACE TRANSFER SWABS FOR COMBINED SERS AND PSI-MS INVESTIGATION

|              |   |
|--------------|---|
| Group Leader | McDaniel, Trevor<br>Undergraduate, Chemistry  |
| Group Member | Noah McClurg, Undergraduate, Chemistry  |
| Mentor       | Prof. Christopher Mulligan  |
| Authorship   | Trevor McDaniel; Noah McClurg; William Fatigante; Jun-Hyun Kim; Jeremy Driskell; Christopher Mulligan |

The pursuit of field-based, forensic evidence confirmation has led to the combination of two analytical methods that are both portable and highly selective, surface-enhanced Raman spectroscopy (SERS) and paper spray ionization-mass spectrometry (PSI-MS). The goal of such a coupling is to provide confirmatory data for forensic evidence present in both bulk phases and as trace residues. To realize the desired SERS enhancement for trace chemicals, paper substrates are modified with metallic nanoparticles, making performance characterization for both analytical methods prudent. In this work, the analytical performance and robustness of modified papers employed as physical transfer swabs will be assessed, and implications towards trace analysis in authentic scenarios will be discussed.

The presented methodology employs both SERS and PSI-MS from a single paper substrate, coined SERS-PSI-MS. The portable MS system utilized was a FLIR Systems AI-MS 1.2 CIT-MS ruggedized for field usage. Trace residues for detection limit studies were produced by spotting known masses of drug standards onto surfaces of interest. For determining spectral accuracy, reproducibility and potential interferences, PSI-MS and MS/MS spectra were extracted from the on-board Griffin System Software (GSS) to Excel for post-processing and examination.

The performance data collected through this study included transfer efficiency of the surface swabbing event, detection limits, spectral differences/reproducibility, and potential degradation of the employed paper swab. To perform the swabbing event, nanoparticle-modified paper substrates were pre-wetted with methanol and used to probe deposited chemical residues from surfaces commonly present in forensic investigations and/or potential crime scenes (e.g. door handles, fabrics, lighters/paraphernalia, storage bags, etc.).

Spectral variability and reproducibility was established through investigation of replicate measurements, examining aspects such as analyte signal intensity, chemical noise (from either the employed swab or examined surface) and spray duration. Inter-sample, inter-substrate, and inter-user reproducibility was also examined. Robustness and potential degradation of the employed paper substrate was physically examined via dissecting stereoscopic photographic images.

## WHAT'S YOUR WHY? MAPPING THE CUSTOMER JOURNEY IN HIGHER EDUCATION

|              |  |
|--------------|--|
| Group Leader | McMahon, Emily<br>Graduate, Business Administration    |
| Group Member | Brett Werner-Powell, Graduate, Business Administration |
| Mentor       | Prof. Steve Taylor                                     |
| Co-Mentor    | Prof. Tice Sirmans                                     |

Across industries, organizations are increasingly moving towards a service-marketing orientation—higher education is no different. This change is largely the result of digital transformation that has drastically changed the way consumers and students gather information about and interact with an organization. New business techniques for understanding this transformation include customer-journey and value proposition mapping.

The current study employs customer journey mapping to better understand recent changes in consumer markets. The maps suggest implications for marketers and managers, shedding light on a bold new era where consumers and organizations co-create value in a way that is fast-paced, relationship-oriented, knowledge-based and no longer centered around exchange of goods.

## HOW SOCIAL COMPARISONS ARE LINKED TO SELF-STIGMA OF SEEKING HELP

|                        |  |
|------------------------|--|
| Group Leader           | Meyers, Adam<br>Undergraduate, Psychology        |
| Group Member<br>Mentor | Kelsey Anello, Psychology<br>Prof. Daniel Lannin |
| Authorship             | Adam Meyers; Daniel Lannin; Kelsey Anello        |

The present research (N = 134) explored the relationship between one's personal values and one's perception of counselees' values, and how this discrepancy is linked to help-seeking self-stigma. Participants reported that they are less self-concerned and more benevolent than counselees, the latter of which predicted lower help-seeking stigma.

## GUARANTEED PREDICTIONS OF FOOTBALL MATCHES

|              |   |
|--------------|---|
| Group Leader | Mussell, Benjamin<br>Undergraduate, Mathematics |
| Group Member | Megan Kalafut, Undergraduate, Mathematics       |
| Mentor       | Prof. Papa Sissokho                             |
| Authorship   | Megan Benjamin; Kalafut Mussell                 |

We are interested in the following general question: Given  $N$  football matches with possible outcomes are WIN, LOSS, DRAW, what is the minimum number of bets needed to guarantee that there are at most  $R$  predictions are wrong? In particular, we investigate this question for  $N = 6$  and  $R = 2$ .

# DOES THE AMOUNT OF SOCIAL OR OBJECT PLAY BETWEEN INFANT AND MOTHER RELATE TO INFANT CONSTRUCTION ABILITY?

|               |   |
|---------------|---|
| Group Leader  | Parrish, Alexis<br>Undergraduate, Psychology                                    |
| Group Members | Jessica Rillo, Graduate, Psychology; Darcy Storer,<br>Undergraduate, Psychology |
| Mentor        | Prof. Julie Campbell  |
| Authorship    | Alexis Parrish; Jessica Rillo; Darcy Storer; Julie Campbell                     |

Infants prefer to watch caregivers during object play, as opposed to face-to-face play or watching objects alone (Deak et al., 2014). Infants spend more time looking at a caregiver's hands and objects during manipulation, as opposed to the caregiver's face (Yu & Smith, 2013). Parents who engage in object play more may be encouraging their infants to manipulate objects more skillfully, than parents who only engage socially. Object construction is one way that infants begin to show an increased ability to manipulate objects (Marcinowski et al., 2016). Thus, infants whose parents encourage object play are expected to perform more object constructions, than infants whose parents engage more socially. The purpose of the study is to investigate whether parent object or social play correlates with infant construction ability. Parent-infant dyads (n=31) were tested for dyadic play at the emergence of object construction ability. Parents were provided with four toys, and instructed to spend five minutes interacting with their infant. Reliable coders marked the duration of object and social play. Object play was defined as dyadic interactions in which a toy was involved, while social play was defined as interactions without the use of toys. For the object construction task, each infant was separately given six sets of toys that could be combined in some manner. A successful construction was defined as occurring when an object was successfully built upon a base item. Correlational analyses are expected to reveal a negative correlation, such that increases in social play will be correlated with decreases in construction ability. A positive correlation between object play and construction ability is expected. Increases in object play are expected to be correlated with increases in construction ability. Previous research supports the idea that infants observe object manipulations of their caregiver(s) by watching the caregiver's hands and objects when engaged in object manipulation. However, there is no research investigating the impact of these observations on infant behavioral outcomes. We propose that object play, as opposed to social play, has an important role on an infant's subsequent ability to create structures from objects successfully.

## A CLINICAL TOOL FOR ORAL SENSORIMOTOR INTERVENTION

|              |  |
|--------------|--|
| Group Leader | Simmons, Jordan<br>Undergraduate, Communication Sciences and Disorders |
| Group Member | Eliana Psarros, Undergraduate, Communication Sciences and Disorders    |
| Mentor       | Prof. Taeok Park   |
| Authorship   | Jordan Simmons; Eliana Psarros; Taeok Park                             |

The purpose of this study is to investigate the clinical tool for oral sensorimotor intervention in patients with dysphagia. The oral stimulator provides a smooth and gentle vibration and pressure that helps increase oral awareness inside the mouth and wake up the individual's articulators. The oral stimulator tool has removable tips to adjust the target of stimulation. For example, the textured probe tips helps to decrease any food aversions and normalize oral sensitivities in patients with dysphagia. Having a sense of oral awareness prevents the individual from pocketing food and stimulates oral cavity. The probe tip of this tool provides tactile cues and sensory stimulation in and around the oral cavity, especially assisting with lip closure. The stimulation tools are beneficial to child and adult patients who need oral sensorimotor intervention.

# CAN STRANGERS FEEL CLOSE? HOW TYPE OF SELF-DISCLOSURE AND THE MEDIUM OF COMMUNICATION AFFECT INTERPERSONAL OUTCOMES AFTER AN INTERACTION

|               |  |
|---------------|--|
| Group Leader  | Swanson, Alexis<br>Undergraduate, Sociology/Anthropology   |
| Group Members | Samantha Gray, Undergraduate, Sociology/Anthropology;<br>Joshua Espinoza, Undergraduate, Psychology; Sergei Deptula,<br>Undergraduate, Sociology/Anthropology; Maia Cain,<br>Undergraduate, Sociology/Anthropology |
| Mentor        | Prof. Susan Sprecher   |
| Authorship    | Samantha Gray; Alexis Swanson; Sergei Deptula; Joshua<br>Espinoza; Maia Cain   |

Aron et al. (1997) created a procedure for generating closeness in stranger-stranger dyads in laboratory and classroom settings. It requires dyads to engage in reciprocal self-disclosure with a list of increasingly intimate self-disclosure topics. Strong evidence shows that the procedure can generate closeness, liking and other affiliative outcomes in pairs meeting for the first time (e.g., Aron et al., 1997; Sprecher et al., 2012). However, the degree of affiliative outcomes experienced can depend on a number of conditions surrounding the interaction. Dr. Sprecher has conducted several experimental laboratory studies to examine factors that may either enhance or diminish the positive outcomes experienced from engaging in the Fast Friends Procedure. Example findings from past laboratory studies at ISU include that reciprocal self-disclosure during the get-acquainted process increases the likelihood of positive outcomes (Sprecher et al., 2015) and the importance of perceiving one is liked in social interactions (Sprecher & Treger, 2015). Under the direction of Dr. Sprecher, we have been conducting a get-acquainted interaction study using the Fast Friends procedure with college students at Illinois State University. The participating stranger-stranger dyads are randomly assigned to engage in either the Fast Friends procedure, a small talk condition, or an unstructured interaction. Furthermore, the dyads are randomly assigned to communicate either via Skype-video or face-to-face.

We hypothesize that (1) dyads who interact face-to-face experience more positive outcomes than dyads who interact over Skype and (2) the Fast Friends procedure will generate more closeness (and other affiliative outcomes) than the small talk condition or the unstructured condition. We are also interested in whether the differences found for the type of self-disclosure depend on the mode of communication. The growth in digital communication, including Skype and other forms of computer-mediated communication, has generated research interest in outcomes experienced due to the medium of communication. We hope to contribute to this literature by examining three types of self-disclosure, over two types of communication mediums, to provide a better understanding of how the various combinations affect the get-acquainted process. Data collection is underway and will be completed by March. Thus far, approximately 30 dyads have participated in our study. We hope to have 60 dyads by the time of the University symposium. Preliminary results suggest that the dyads experience positive outcomes from all three self-disclosure tasks and regardless of medium of communication, but more detail will be provided in our poster.

# SWALLOWING IN PATIENT WITH PARKINSON'S DISEASE: A CASE STUDY

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**Background-** Parkinson's disease (PD) is a neurodegenerative disorder common among adults. This disease affects the central nervous system (CNS), impacting the ability of movement. The symptoms of PD are tremors, stiffness, or loss of balance. Individuals with PD may suffer from these limited or uncomfortable movements in their speech, mood, facial expressions, or any action which requires muscular application. In addition, swallowing difficulty, also known as dysphagia, is prevalent to an individual with PD. The purpose of this case study was to investigate the impact of Parkinson's disease (PD) on orofacial muscle strength, swallowing function, and swallowing quality of life.

**Methods-** The subject was a 70 years old male who was diagnosed with the early stage of Parkinson's disease. Swallowing Quality of Life (SWAL-QOL) questionnaire, oral facial strength, and a detailed interview were collected. The SWAL-QOL was used with at ranges from one to five of scale. The interview entailed the patient's medical history and swallowing function.

**Results-** In the SWAL-QOL, under these subcategories: burden, desire and duration, selection of food, communication, fear, mental capacity, and social skills, there was a 100% ease portrayed. The percentage of swallowing physical symptoms was 94.64%. The fatigue and sleep subcategories were 91.67%. For the orofacial muscle strength, the outcomes indicated as follows: 6.67 kPa lips compression, 29.67 kPa swallowing pressure, 25.67 kPa maximum tongue pressure, 14.67 kPa left buccal pressure, and 19.67 kPa right buccal pressure. In the interview, the subject reported no swallowing difficulties except of drooling. Also, the subject expressed fatigue.

**Discussion-** In this study, the individual with PD showed mild swallowing difficulties such as drooling. This may be related to the early stages of PD. The symptoms based on severity of PD or how far along an individual may be within the stages of PD. However, the orofacial muscle strengths were weaker than normal older individuals. Additionally, the subject conveyed no difficulty of burden, desire and duration, selection of food, communication, fear, mentality, and social skills. If any of these subsections, listed previously, progressively worsen over time the subject's quality of life can be negatively impacted along with the likelihood of an insufficient swallow. Caregiver and medical team need to keep monitoring swallowing and other function for an individual with PD.



# EFFECTS OF EXERCISE IS MEDICINE ON CAMPUS INTERVENTION PROGRAM ON BARRIERS TO PHYSICAL ACTIVITY

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| Mentor        | Prof. Kristen Lagally  |
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**Introduction:** Exercise is Medicine on Campus (EIMOC) is an intervention program created by the American College of Sports Medicine (ACSM). The main goal of the program is to increase physical activity among the campus community. At Illinois State, the school of Kinesiology and Recreation (KNR) has a partnership with Student Health Services (SHS), Student Counseling Services (SCS), and Campus Recreation. SHS and SCS refer clients to the EIMOC staff comprised of KNR faculty, graduate assistants, undergraduate interns, and campus recreation personal trainers. Clients will receive individualized training over the course of at least six weeks.

**Purpose:** The purpose of this study is to assess client outcomes and program success.

**Subjects:** 44 women (80%) and 11 men. 16 clients were already physically active when beginning the program (29%), 39 were not active. 42 were referred by SHS (76%), the rest (13) were referred by SCS.

**Methods:** EIMOC staff will begin with a new client by assessing barriers to physical activity, motivation, and exercise history. This is done through a questionnaire given to clients at an intake session. About halfway through the program (at least six weeks in), clients will also be given a transition questionnaire to assess progress. In the present study, intake questionnaires and transition questionnaires were analyzed. Questionnaires included a 1-5 scale asking clients to what extent did EIMOC affect different barriers to their physical activity.

**Results:** Increases in number of days of the week they participated in cardiovascular training (CV) and resistance training (RT) increased from 1 to 2.93 (SD=1) days and from 0.47 to 1.67 (SD=1) days, respectively. In addition to increased days of exercise, participants also noted improved barriers to physical activity such as Lack of Willpower and Lack of skill, which was done using a T-Test.

**Conclusions:** Based on the results, the program was successful in improving barriers to physical activity. Clients also reported increases in frequency of cardiovascular training and resistance training.

## HOSPITALIZED ADOLESCENTS MISSING OUT ON SEX ED

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Human sexuality encompasses the sexual knowledge, beliefs, attitudes, values, and behaviors of individuals. Its various dimensions involve the anatomy, physiology, and biochemistry of the sexual response system; identity, orientation, roles, and personality; and thoughts, feelings, and relationships. Sexuality is influenced by ethical, spiritual cultural, and moral concerns (Esses, Small, Rodemann, Hartman, 2019). That being said less than one-half of sexually active adolescents have received counseling regarding contraception and sexually transmitted disease (STD) from their health care provider. We hypothesized that hospitalized adolescents would be interested in receiving reproductive health education and/or STD testing. In addition, we assessed the opinion of female adolescents on initiation of contraception during hospitalization (Guss, Wunsch, McCulloh, Donaldson, Alverson, 2014).