17th Annual
SUMMER RESEARCH SYMPOSIUM
July 30 & 31, 2020 SOUTHERN ILLINOIS UNIVERSITY CARBONDALE

ABSTRACT BOOKLET

10:00 a.m to 12:15pm
Thursday, July 30, 2020 &
Friday, July 31, 2020

SIU SOUTHERN ILLINOIS UNIVERSITY
MCNAIR SCHOLARS PROGRAM

SIU SOUTHERN ILLINOIS UNIVERSITY
SI BRIDGES TO THE BACCALAUREATE

Programs funded by support from the US Department of Education and the National Institutes of Health
Overview of Programs

The Ronald E. McNair Post baccalaureate Achievement Program is a comprehensive program structured to prepare undergraduates for successful careers as graduate students, professors, and professional researchers. The program is an educational opportunity program funded under the Higher Education Act of 1965 collectively known as TRIO Programs. The McNair Scholars Program is funded by the U.S. Department of Education and provides services to low-income/first-generation college students or students who are members of a group which is underrepresented in graduate education with effective preparation for doctoral study. Southern Illinois University Carbondale accommodates 29 students each year. This program is funded by a grant written by Karen Renzaglia and Rhetta Seymour for the 2017-2022 grant cycles.

The Virtual McNair Summer Research Institute (SRI) is an eight-week intensive program, which equips McNair Scholars with the research skills necessary to compete in graduate school. During the SRI, students work closely with faculty mentors to complete individual research projects, conducting fieldwork, compiling literature reviews and composing original research papers. In addition to research, students also undergo six weeks of strenuous GRE training sessions aimed at improving their GRE composite scores. This year at the conclusion of the SRI, each student will present a 5-minute flashtalk at the Virtual Summer Research Symposium. Throughout the remainder of their undergraduate career, many McNair Scholars will present their research at national and regional conferences.

The Southern Illinois Bridges to the Baccalaureate Program (SI Bridges) is funded by the National Institutes of Health (NIH) and provides paid biomedical and behavioral science research training and professional development for underserved community college students at John A. Logan College (JALC) and Shawnee Community College (SCC). Students receive assistance in transferring to SIU and completing a baccalaureate degree in science, technology, engineering, math, or social science disciplines. This summer SI Bridges students participated in a virtual 12-week Summer Research Immersion that enhanced their research and critical thinking skills through a combination of hands-on and remote learning. It also exposed them to professional development resources that will help with their transition to a 4-year institution. At the conclusion of the SRI, each student delivers a 5-minute flashtalk at the Virtual Summer Research Symposium. In the fall, many of the SI Bridges students will return to work in individual labs with SIU faculty. This program is funded by a grant written by Karen Renzaglia and Laxmi Sagwan-Barkdoll for the 2019-2024 grant cycles.
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<td>April Robinson-Kain</td>
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ABSTRACTS
**The effect of herbicide drift on insect diversity**

Matthew Claar, Samuel Ramirez and Karla Gage, PhD

Around the turn of the 20th century, the use of chemical herbicides for weed management has become increasingly common. Many of these herbicides are effective for a while; however, it is not uncommon for herbicide resistance to occur in target species. So often, more potent chemicals and more aggressive spraying occur to compensate for the acquired resistance of unwanted plants. This strategy is not without issue; one such issue is off-target drift. This study seeks to assess the consequences of this off-target drift on plants that native pollinators depend on. Pollinators are not only important for the health of natural areas but they are crucial for agriculture as well. This study focuses on the effect of the herbicide Dicamba and 2,4D on insect diversity in our study plots.

**Psychological Stress of COVID-19 among young adults**

Tehya Payne and Laxmi Sagwan-Barkdoll, PhD

COVID-19 is a global pandemic that started in late 2019, in China. Many research studies have been conducted globally concerning an increase in stress due to the pandemic. My research study focused on the psychological stress leading to changes in lifestyle during the COVID-19 pandemic. A survey consisting of 15 questions was created in survey monkey and was distributed through email and Facebook. The survey consisted of questions regarding lifestyle changes including eating habits, exercise, sleep, relationships, mindful practices and mental health. We received 96 responses out of which 44.79% were from the age group of 18-24 years, with 88.37% female and 11.63% male and 93.02% of them were white with 9.3% Black or African American. With respect to lifestyle changes, our results demonstrated that this age group had moderate (44.19%) levels of anxiety, were fairly often (41.86%) nervous and stressed accompanied with 6-8 hours of sleep, and 1-30 minutes/day of exercise. They also felt less motivated (58.14%), struggled with concentration (60.47%) and showed a significant change in eating habits (79.07%). Hence, this study concludes that with the lockdown in March followed by campus closure, and subsequent transition to virtual learning may have acted as stress triggers among 18-24 years leading to psychological stress measured by changes in their lifestyle.
Genotyping genetically modified mice with the *Foxo1* forkhead transcription factor and Foxg1-cre resulting in tissue specific deletion in the pituitary gland

Ashley Bryant and Buffy S. Ellsworth, PhD

FOXO1 and FOXO3 are closely related forkhead box transcription factors that aid in the role of somatotroph differentiation. In this study, genetically modified mice are used for observing the role of these forkhead transcription factors in pituitary gland development and function. *Foxo1* is expressed in the pituitary gland, heart, and placenta. We use cre-lox mediated technology to promote tissue specific deletion of *Foxo1* in the pituitary gland. Flox*(f/f)* is an indication that the *Foxo1* gene was “floxed” by inserting loxP sites. The use of cre deletes the floxed *Foxo1* gene. *Foxg1-cre* stimulates pituitary specific deletion, because *Foxg1* is expressed in the pituitary gland causing cre to be present in the pituitary gland. This method prevents the demise of mice, if *Foxo1* deletion were to occur everywhere, this causes early embryonic lethality. Mice are mated based on their genotype, which is determined through genotyping analysis performed via PCR and gel electrophoresis. Two strains of mice have been mated with the genotypes as listed: Dam: *Foxo1*+/f, *Foxo3*+/f, *Foxg1*+/+, Sire: *Foxo1*+/f, *Foxo3*+/f, *Foxg1*+cre. Ten embryos were then collected from the mother and a biopsy was preformed collecting a portion of each tail. From here the DNA was isolated using lysogenic and neutralizing buffers and then prepared for PCR After collecting PCR samples, they were then loaded onto a 2% agarose gel and ran through electrophoresis, where the migration of distinct bands was visualized. These bands will determine the genotype for each embryo. The results obtained indicated that 60% of the offspring were *Foxo1*f/f, *Foxo3*f/f, *Foxg1*+cre, 30% were *Foxo1*+/f, *Foxo3*f/f, *Foxg1*+cre, and 10% *Foxo1*+/f, *Foxo3*f/f, *Foxg1*/+.  

Infodemiology study on interest in Firearm Acquisition in Illinois during COVID-19

Lauren Troutt, Jason Henry, and Laxmi Sagwan-Barkdoll, Ph.D.

The COVID-19 pandemic has had a tremendous impact on our economy, health and psychology in the United States. Although, it is not clear yet on how this impact will affect public policy or the attitudes of the citizens. By using infodemiology as a tool, the research looks for such information between two public health and safety issues that can be calculated in near time. Which in this instance are the COVID-19 pandemic and gun ownerships in Illinois. The data appears to have had an increased interest in gun ownership, since the onset of shelter in place policies being instituted in the state of Illinois.
Effects of Dietary Fat Intake on Neuroinflammation in Rats

Tamara Keene and Joseph Cheatwood, Ph.D.

An increase in impulsive behaviors has been shown to proceed and predict obesity in rats. Along with impulsivity, it has been noted that seeking a food reward is an accompanying factor in predicting obesity, but debate surrounds the dependence of this variable on impulsivity. In order to properly assess obesogenic diets, we have proposed the following hypothesis: high fat and/or high sugar diets cause an increase in impulsivity leading to more impulsive food choices, ultimately increasing consumption of HF/HS food to further produce more impulsive behaviors. Further, impulsivity may lead to an increased preference for unhealthy food, as unhealthy food is considered to represent a compelling food reward. Within this study, the behavior of each rat was tested in three differing scenarios. Following behavioral testing, brain tissue was cut and analyzed for expression of the neuroinflammatory markers Iba1 and GFAP. Iba1 is a marker of microglia activation and GFAP indicates reactive astrocytosis. To assess effects of dietary fat intake on hippocampal neurogenesis is the study rat’s, Ki67-immunopositive cells in the hippocampus were quantified in both groups. Higher expression of Iba1 and GFAP were expected in the high fat diet group. It was also expected that levels of neurogenesis in the hippocampus would be reduced in rats fed a high fat diet, representing a likelihood of cognitive decline.

African Americans in Colonial Moravian Society

April Robinson-Kain and Pamela Smoot, PhD

The Moravian church was formed by a cluster of protestant pacifists originating in Bohemia but driven underground for more than 300 years. A small party of Moravians settled on a 100,000-acre tract of land in west central North Carolina called Wachovia, believing they were called there, to build an exclusive settlement and bring honor to God. They developed a patriarchal plan which entailed renting parcels of land to each church member while building a town centrally located for artisans and craftsman. In addition, a central community was designed to attract Moravians, in other parts of Wachovia, to the center of their land. Experiencing a shortage of labor caused the Moravians to engage in the enslavement of African Americans on whose backs, labor, and talents built the Moravian divine community. Although the difficult and tedious work fell to the slaves, their most arduous task was to survive and forge connections within this society. The Moravians are heralded by scholars for their inclusive treatment of African Americans before the Revolutionary War. However, little is mentioned about their treatment of the enslaved after this war. This project focuses on the gap in the literature concerning the Moravian transition from a self-contained group linked together by strict regulations to an industrial society fueled by commerce, changing attitudes of Moravians toward free and enslaved blacks, and the opinions of neighboring whites who influenced the ideas of racial segregation on the Moravians.
Unraveling the Link Between Protective Factors and Juvenile Delinquency

Jocelyn Ortiz and Daryl Kroner, PhD

The prevalence of juvenile delinquency is a concerning issue to society due to its negative effects on communities, families, and youth success. Extensive research has been conducted to identify the risk and protective factors associated with juvenile delinquency. However, many juvenile justice programs have failed to reach their full potential as we continue to see large rates of recidivism amongst youth. The purpose of this study was to examine the unique contribution of protective factors on juvenile arrest in order to implement effective prevention strategies in rehabilitation programs. Using existing data, a partial correlation was administered to measure the statistically significant relationship between protective factors and juvenile arrest, after controlling for risk factors. Results showed a lack of correlation between protective factors and juvenile arrest, suggesting that risk factors are the sole predictor of delinquent behavior. This study has implications for improving prevention programs by emphasizing the use of risk assessments to help meet the treatment needs for juvenile offenders.

The Impact of Generational Membership and Other Determinants of Racial Attitudes Post – Obama

Diamoneek Green and Randolph Burnside, PhD

The post-Barack Obama era offers a chance to test the impressionable years hypothesis, which asserts that historical events happening during young adulthood, have a lasting impact on young adults’ political attitudes. Using data from the 2018 General Social Survey, we examine White Generation Z members, who came of age towards the end of Barack Obama’s presidency, to see if those individuals exhibit less racial resentment and old-fashioned racism than older generations of Whites. The findings suggest that Generation Z members are more resentful than the previous two generations. Thus, contradicting Nteta and Greenlee’s (2013) findings of continuing liberalization of younger generations. Additionally, other predictors that traditionally impact racial attitudes such as gender, income, education, and social contact, have similar effects on White racial attitudes. These findings indicate Barack Obama’s presidency did not have a lasting impression on the racial attitudes of Generation Z.
Thursday, July 30, 2020
11:40:00 AM

Perception of Gardening with Native Plant Species Across the United States

Shawn Arreguin and Jessica Crowe, PhD

Biodiversity has become a critical issue throughout the globe and more than ever it has become imperative to find a solution. An increase in native gardening is a commonly cited solution because it would create additional habitats for native animals’ species, thereby benefiting biodiversity. Home gardeners would need to be willing to plant native in order for this idea to work. This project sought to understand people’s perception of native gardening and their willingness to do so. Amazon Mechanical Turk was used to survey 707 adults in the United States and determine their perception of gardening with natives and what might motivate people to grow native species. Descriptive data finds that, overall, people are willing to plant native and would even be willing to go to workshops to learn more. In addition, people would be heavily motivated by financial incentives such as free plants, tax breaks, and funding. It is important to recognize and learn from this data so that we can begin to create incentives to gardening with natives in order to benefit native biodiversity. People are also motivated to buy plants for their beauty, so it would be important to showcase aesthetically pleasing native plants in order to motivate people to purchase them.

Thursday, July 30, 2020
11:50:00 AM

Chlamydia Vaccines: a Review

Mya Tatum and Vjollca H. Konjufca, PhD

*Chlamydia trachomatis* (Ct) is a leading cause of bacterial sexually transmitted infections and preventable blindness worldwide. If left untreated, in women Ct infections can lead to reproductive tract pathologies such as pelvic inflammatory disease, infertility, and ectopic pregnancy. As it currently stands, there are no vaccines available to protect against Ct infections. A strong cellular immune response is desirable in a Ct vaccine. The role of antibodies in protection against a primary infection is unclear. In this study we have examined the humoral response induced in mice after immunization, either per orally or subcutaneously with inactivated *Chlamydia* organisms. We found that both forms of immunization induce high titers of *Chlamydia*-specific serum antibodies. Ongoing efforts are directed towards characterizing mucosal antibody responses and evaluating protective efficacy of antibodies against vaginal challenge with *Chlamydia*. This work has importance for developing vaccines against *Chlamydia* and possibly other sexually transmitted pathogens.
Multisensory Integration Related to Tooth Extraction
Logyn Frassato, Natalee Hite, Rebecca Embalabala and Diana Sarko, PhD

Naked mole-rats (Heterocephalus glaber) have a very similar dental cortical representation compared to humans. Therefore, to study the effects of tooth extraction, this research project will focus on sensory processing related to detention within a naked mole-rat. During this study, recordings of individual neurons responsive to dental stimulation will be made in order to look in on how exactly neurons are able to integrate other senses such as sound or touch. For the tooth extracted animals, the recordings will be compared to another group known as the “sham animals” (group without tooth extraction), to observe brain plasticity of these cortical regions. Overall, this study on the naked mole-rat will be used as a model of cortical reorganization following a human tooth loss.

Occurrence and Evolutionary Analysis of Coat protein sequence of Mirafiori Lettuce Big Vein Virus (MLBVV)
Emily Duran, Jason Henry and Laxmi Sagwan-Barkdoll, Ph.D.

Lettuce Big Vein Disease is economically detrimental in areas of lettuce production. The affiliate is Mirafiori lettuce big vein virus (MLBVV), a single stranded highly flexuous RNA virus belonging to the Ophiovirus genus. Further research into the grouping of Ophioviruses is important to treatment and prevention in agriculture. In this study, the coat protein (CP) gene of MLBVV was used to investigate the evolution of the virus based on geographic location and other Ophioviruses. Using bioinformatics, coat protein sequences were downloaded from NCBI virus and an evolutionary tree was created. The results indicated genetic diversity among isolates from different geographical regions except Spain which forms a separate clade. MLBVV was also found closely related to Tulip mild mottle mosaic virus when compared to other ophioviruses.
Friday, July 31, 2020

10:30 AM

Exploring Variations in SARS-CoV2 Spike Protein Sequences among strains in 5 US states with highest deaths

Kailee Henderson, Jason Henry and Laxmi Sagwan-Barkdoll, Ph.D.

The United States has the highest global deaths with approximately 140,120 total deaths due to COVID-19 caused by the virus SARS-CoV2. The five states with the highest deaths in the US were New York (32,520), New Jersey (15,737), Massachusetts (8,450), California (7,816), and Illinois (7,517). We hypothesized that the S (spike) protein played a role in the virulence of the virus and is responsible for a high number of deaths in these 5 US states. We downloaded 100 S protein sequences from the 5 US states from NCBI virus database. Multiple sequence alignment showed that there is a mutation in the 614 position amino acid from D to G. Phylogenetic analysis further confirmed that the existence of two clades one with D and the other with the G variant, varied in regional expression of the S-protein which correlated to the heightened deaths in US.

10:40:00 AM

Beneficial Symbiosis Between Euprymna scolopes and the bacteria Vibrio fischeri

Dawn Hale and Bethany Rader, Ph.D.

The human body has ten times more bacterial cells than human cells. These bacteria can be helpful or harmful to their human hosts. I will specifically be focusing on the beneficial bacteria by using the model beneficial symbiosis between the Hawaiian bobtail squid Euprymna scolopes and the bacteria Vibrio fischeri. Specifically, I am interested in understanding how hosts tolerate their potentially harmful bacteria. I am interested in the V. fischeri gene LpxF, since it is similar to a gene in other bacterial pathogens that detoxifies LPS by altering its structure. We have received a mutant strain of V. fischeri from a collaborator that is missing the LpxF gene. During my project I will characterize the mutant strains growth to the wild type parent strain, compare the sensitivity to antibiotics to the wild type strain, and characterize the toxicity of the strain in the host.
The Impact of Socioeconomic Status, Parental Negative Talk, and Gender on Child Internalizing and Externalizing Behaviors
Margaret Schlotter and Lisabeth Dilalla, PhD

Mental and behavioral problems in young children can lead to anxiety, depression, impaired academic performance, or substance abuse in adolescence and adulthood. Negative parenting practices and economic stressors have been associated with increased mental and behavioral problems in children. Boys typically display more aggressive-type behaviors while girls display more depressive behaviors. Data from 147 4- and 5-year-old children were used to test the effects of parental verbal negative talk and socioeconomic status (SES) at age 4 on internalizing and externalizing behaviors at age 5. Regression analyses showed a significant main effect of SES on girls’ externalizing behaviors and a trending interaction effect for boys’ internalizing behaviors, showing that boys with high negative parent talk and low SES show higher internalizing, as expected, but boys with low negative parent talk and high SES also show higher internalizing. Post-hoc regression analyses showed that higher negative talk and lower SES at age 4 significantly predicted age 4 aggression in boys only. The developmental pathway for internalizing and externalizing behaviors may differ for boys and girls. Negative parenting practices and lower SES are particularly important to examine as risk factors when creating treatment plans for externalizing behaviors in preschool-aged boys.

Well Spoken: A Neo-Aristotelian Analysis of Barack Obama’s 2008 Victory Speech
Martiece Arrington and Craig Engstrom, PhD

The purpose of this study was to examine Barack Obama’s 2008 Victory Speech that was delivered from Giant Park in Chicago, IL. Obama is known for his use of rhetorical style of speech. This study used a neo-Aristotelian analysis to critique the speech by applying three of the framework’s five canons of rhetoric—invention, arrangement, and style—to identify the methodology behind a speaker’s rhetorical strategies that have persuasive impact on an audience. Findings from this analysis highlight Obama’s use of classic American tropes of personal struggle and perseverance. He combines his personal story with inclusive language and universal emotional appeals (pathos) that increase identification with the audience. Using these rhetorical devices in combination with stylistic delivery universalizes Obama’s central message of “hope, change, and unity.” This analysis contributes to rhetoric and speech writing by highlighting common ideas into poetic forms, which can be used by public speakers to enhance delivery of their message. Therefore, it is safe to be lured into what could possibly be, Well Spoken.
What Factors Affect Reproductive Success in Tradescantia ohiensis?

Eeron Valdivia and Sedonia Sipes, PhD

Many plants rely on animal pollinators for reproduction. Traits that play a role in attracting pollinators, such as the number and size of flowers, and environmental factors, such as flower density, can affect a plant's reproductive success. Floral display size is known to affect visitation of bee-pollinated plants. Floral display can be quantified by the number of flowers produced, the number of flowers open at one time, or the height of an inflorescence. I studied the reproduction of the native wildflower Tradescantia ohiensis. T. ohiensis is a bee-pollinated plant that requires cross-pollination to set fruit and seed. I hypothesized that plants with taller inflorescences and more flowers will have higher pollinator visitation rates and higher fruit set than plants with short inflorescences and/or fewer flowers. I also hypothesized that T. ohiensis plants that grow near to other conspecifics will have higher pollinator visitation rates and higher fruit set than plants that are isolated. The relationship between height and fruit set was not what I predicted: shorter plants had higher fruit set, though a linear regression showed the relationship was not significant. Flower number had no significant relationship to fruit set. The relationship between the mean distance to 3 nearest conspecific neighbors and fruit set was as expected: plants close to other T. ohiensis plants had higher fruit set. This relationship was marginally significant.

Plant Parasitic Nematodes Associated with Pigeon Pea [Canjanus cajan (L.) Millsp.] and Integrated Management Approaches

Millien Regis, Jason Bond, PhD and Ahmad Fakhoury, PhD

Pigeon pea production is facing enormous disease challenges in many countries in South America, Africa, and Asia. These diseases are caused by different types of pathogens, including fungi, viruses, and nematodes. The plant-parasitic nematode has known as the most harmful pathogen to pigeon pea worldwide. Meloidogyne incognita feeds on plant roots and gives rise to root galls. Meloidogyne incognita attacks consequently cause poor growth and reduce yield. This study has objective to: 1) Develop tools to study the interaction between Meloidogyne incognita (Southern Root Knot Nematode RKN) and pigeon pea, 2) test the efficacy of a chemical seed treatment on this interaction, and 3) explore the efficacy of potential biocontrol agents on RKN. This research is conducted by 1) treated pigeon pea seeds by using (ILEVO, SALTRO, Pochonia, Tolypo) 2) stem, height, and chlorophyll are measured for each cultivar 3) root infection analysis. This study is needed in pigeon pea fields to select the possible treatments to reduce the damage Meloidogyne incognita can cause.
Friday, July 31, 2020
11:40 AM

Professional Knowledge and Practices for Working with English Learners
Carlos Danny Zarate and Katherine Martin, PhD

As the number of English learners attending schools in the United States continues to rise, teachers across the country struggle to accommodate them in their classrooms. Often, teachers lack extensive multicultural and linguistic training which leads to many negative outcomes for English learners. The current study examined the prior preparation, current language acquisition beliefs, and classroom and communication practices of education professionals who may work with English learners. Specifically, this study targeted special education teachers, speech language pathologists, and other professionals with similar credentials employed at Brehm Preparatory, a boarding school located in Carbondale, Illinois, or other schools around the United States. Preliminary data were collected through surveys based on the SIOP (Sheltered Instruction Observation Protocol) Model, a framework of best practices for teaching English learners with over 20 years of extensive research. Preliminary results reveal some of the strengths and weaknesses teachers have regarding working with English learners. The data will ultimately be used to develop a better understanding of teacher knowledge and design effective professional development training.

11:50:00 AM

Analyzing the Cinematic Representation of the Dominican Republic Post-Dictatorship
Mackenzie Rosario and Angela Aguayo, PhD

The purpose of this study is to analyze the cinematic representation in the Dominican Republic post-dictatorship. There was a 31-year gap of all independently produced media production during the regime of Dictator Rafael Trujillo which then led to an explosion of media making upon his assassination in 1961. During this process I was able to explore the differences other countries faced during their dictatorships and understand to what extent the amount of it was being censored by the government. This study seeks to answer the research question, how does documentary representation function in the post-dictatorship Dominican Republic? The goal is to decipher how documentary filmmaking plays a role on our collective memory and how it serves as a bridge to negotiate social change. I identify this through the analysis of documentary film After Trujillo, which revisits several memorial sites and ruins of Trujillo’s dictatorship from 1930 to 1961 in the Dominican Republic.

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Closing Remarks