17th Annual
Student Research Forum
A Virtual Presentation

Tuesday, April 6, 2021
The Ohio State University at Newark
Student Research Forum

Purpose:
To promote student research activities and increase the number of students undertaking honors theses.
To increase student-faculty research endeavors and faculty mentoring of students in research activities
To prepare Ohio State Newark students for participation in other research conferences, including The Ohio State University Denman Undergraduate Research Forum.

We thank the following participants who make this forum possible:
Dean/Director William L. MacDonald, PhD, for his initiative and support of the forum.

JUDGES
• Özlem Doğan Ekici, PhD, Associate Professor, Chemistry and Biochemistry
• Dorian Harrison, PhD, Assistant Professor, Teaching and Learning
• Terri Hessler, PhD, Associate Professor, Educational Studies
• Asuman Turkmen, PhD, Associate Professor, Statistics

Agenda
1 – 3:00 p.m.  Student Oral Presentations
4:00 p.m.  Awards Ceremony

Presentation of Awards by Nathaniel Swigger, PhD
Associate Professor, Political Science, Ohio State Newark

Oral Presentations, Proposed Research
• Rashmiah Amer
• Fan Fei
• Michael Fleisher
• Cheyanne M. Hodge & Madison C. Roth
• Kayla Kucway
• Eleanor MacDonald

Oral Presentations, Completed Research
• Austin M. Brammer & Jarrett A. Rardon
• Rebecca Gager
• Sophia R. Mustric
• Abigail Sedziol
Abstract: COVID-19, the disease responsible for the recent pandemic, is caused by a novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). With newly emerging variants, and the danger of potential future coronavirus infections, novel broad-spectrum therapies must urgently be developed in the fight against COVID-19.

The main protease (Mpro) for SARS-CoV-2 is an essential proteolytic enzyme that plays important roles in the replication of the virus in human host cells. A SARS-CoV-2 Mpro mutation is highly unlikely as it is often lethal to the virus. Blocking the function of the SARS-CoV-2 Mpro offers a promising targeted therapy option for the broad-spectrum treatment of the SARS-CoV2 infection responsible for COVID-19. Such an inhibitory strategy is currently successful in treating other viral diseases such as AIDS and Hepatitis C, for which there are no vaccines available.

In this work, we are developing effective inhibitors that are specific for SARS-CoV-2 Mpro by using rapid synthetic approaches and then testing their efficacy against the coronavirus main protease targets, thereby developing valuable broad-spectrum therapeutics against COVID-19 and its variants.
Abstract: A pandemic of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), named as coronavirus disease 2019 (COVID-19) by the World Health Organization (WHO), emerged in Wuhan, China and it is currently underway resulting in worldwide severe morbidity and mortality.

Since the beginning of the pandemic, visualizations have assisted us to understand the unpredictable nature of this virus by providing detailed information based on data and variables on the ground. During the pandemic, visualizations can help us to analyze features such as the infection rate within different groups of people, thus we could interpret the reasons behind the high infection rate.

The objective of our study is to overview some of the state-of-art visualization techniques to illustrate the dynamics of the COVID-19 spread for Ohio. Although there are some potential variables, such as age, that are known to be associated with COVID-19, it remains unclear if the affection and death rates for COVID-19 differ significantly for some other factors. Therefore, we are going to analyze COVID-19 data from Ohio and the USA to discover such factors statistically.
Aza-Peptide Michael Acceptors Targeting the Immoproteasome for the Improved Treatment of Multiple Myeloma

MICHAEL FLEISHER

Faculty Sponsors: Özlem Doğan Ekici (Chemistry and Biochemistry)
Category: Proposed Research, Oral

Abstract: The proteasome is an integral part of the ubiquitin-proteasome pathway, which is responsible for the degradation of proteins within the cell as well as regulation of the cell cycle and programmed cell death (apoptosis).

The immunoproteasome is an alternate form of proteasome that is expressed due to immune response and also an important target in multiple myeloma (MM) and inflammatory disorders. Hence, selective inhibition of the immunoproteasome over the constitutive proteasome may offer an alternate route to treatment.

Thus, the goal of this project is to design and synthesize potent and selective immunoproteasome inhibitors. To this end, aza-peptide Michael acceptors bearing various benzyl group substituents proposed to occupy the prime site of the immunoproteasome active site are being developed and synthesized.
Parental Effects on Distance Learning
CHEYANNE M. HODGE & MADISON C. ROTH

Faculty Sponsor: Christopher W. Robinson (Psychology)
Category: Proposed Research, Oral

Abstract:

Background
In 2020, COVID-19 brought new struggles to the education system and educators of all grade levels. Distance teaching is a skill most teachers and parents were unprepared for, leaving many younger students falling behind. Past studies focused on distance learning in college students (Abdous & Yoshimura, 2010; Means et al., 2010), neglecting the needs of K-12 students. With this lack of research, frameworks have been tailored to adult students. Previously, dropout rates (Wang et al., 2009), and teacher involvement (Borup et al., 2013), have been the primary focus of these studies, overlooking the caretakers’ role in the distance learning environment. This proposed study focuses on younger students and their caretaker’s involvement in distance learning.

Methods
Families with fourth graders will be given questionnaires in the beginning and end of the experiment. The first questionnaire will assess the student’s personality and learning styles in order to identify different learner profiles. Participants will be split into three groups as they complete the same math unit. The first group will watch lectures without adult supervision. Meanwhile, the second group will be asked to be present in the room while the child is completing the assignments, whereas the third group will be asked to actively participate in the following prompts from the lecture and keep the students engaged. The students will be tested, and their outcomes recorded. At the end of the experiment, participants will assess the task assigned to address what was beneficial and any difficulties faced.

Predictions
It is predicted that families where the parents are present will perform far better than those asked to learn on their own, while students with parents actively participating in the learning process will have the best results. The data collected can be used to help create a training program for parents in the future.
Aza-peptide Michael Acceptors for the Improved Treatment of Multiple Myeloma

KAYLA KUCWAY

Faculty Sponsor: Özlem Doğan Ekici (Chemistry and Biochemistry)

Category: Proposed Research, Oral

Abstract: The proteasome is a critical component of the ubiquitin-proteasome pathway (UPP) that is responsible for quality control of newly synthesized proteins in eukaryotic cells. This is important for various cancer treatments, including multiple myeloma (MM). The inactivation of the proteasome is a validated strategy for the treatment of MM.

Current proteasome inhibitor drugs on the market such as Bortezomib and Carfilzomib have been quite effective and revolutionized the treatment of MM. However, they have severe side effects. Bortezomib causes peripheral neuropathy and Carfilzomib causes adverse cardiovascular effects.

Aza-peptide Michael acceptors are inhibitors developed in our laboratory and designed to inhibit the proteasome with a chemical warhead that consists of an aza-P1 amino acid and a trans double bond. Our results show that aza-peptide Michael acceptors are submicromolar range inhibitors of the 20S human proteasome. In this work, we aim to improve the inhibitory potency and selectivity by attaching a benzyl group with various substituents to the Michael acceptor warhead.
Geographic and Ecological Patterns of Hoverfly (Diptera Syrphidae) Diversity in Ohio

ELEANOR MACDONALD

Faculty Sponsor: Karen Goodell (Evolution Ecology and Organismal Biology)

Category: Proposed Research, Oral

Abstract: Hoverflies are a family of flower-visiting flies that have nectar-drinking adults and are considered pollinators of many plant species. Estimates of 400+ hoverfly species are in the Northeastern United States, but current data for Ohio are lacking. We have initiated the first statewide effort to document hoverflies since 1913 as part of the Ohio Bee Survey that aims to complete the first inventory of Ohio’s bees. Hoverfly specimens were collected as “by-catch” from traps set for the bee survey. My research aims to identify all the hoverfly specimens collected as part of this effort in 2020 and to determine how the landscape affects the abundance and diversity of hoverflies in Ohio. I will test the following hypotheses: (i) Sites with higher numbers of bees will have higher numbers of hoverflies. (ii) Urbanization negatively affects hoverfly abundance while increased forest cover around a collection site positively affects hoverfly abundance. A correlation between hoverfly abundance and bee abundance would suggest that hoverflies and bees respond to the same kinds of environmental factors, such as flowers and habitat quality.

The impact of landscape on hoverfly abundance and richness will be analyzed by correlating hoverfly abundance and diversity with spatially explicit landscape-level land use data from the National Land Cover Database. I will investigate variation of hoverfly abundance in different habitats and across different landscape contexts, such as heavily forested versus heavily developed. While bees and hoverflies are both considered pollinators, they have different and diverse ecologies and life histories, so it is possible that they may not respond to the same landscape level influences.
That’s so Nelch: The Effect of Prosody on Memory for Novel Adjectives

AUSTIN M. BRAMMER & JARRETT A. RARDON

Faculty Sponsor: Julie M. Hupp (Psychology) and Melissa K. Jungers (Psychology)

Category: Completed Research, Oral

Abstract: Prosody is the way something is spoken, which is vital to successful comprehension of language. Prosody helps adults and children infer the meaning of unfamiliar words (Hupp, Jungers, Hinerman, & Porter, 2021), and affects how adults remember words. Research with adults showed that if an unfamiliar word (e.g., blicket) was spoken with congruent prosody (i.e., low pitch and loud to mean big), then adults remembered the meaning of this new word better than if it was spoken with incongruent prosody (i.e., low pitch and loud to mean small; Shintel, Anderson, & Fenn, 2014). With children still learning to use linguistic tools like prosody, this research will investigate whether congruent prosody improves memory when it comes to word learning in children.

Study 1 was a pilot study with adults (n=74) to select our image stimuli to be used in Study 2 and Study 3. Study 2 (adults) and Study 3 (preschool children) will be a replication and extension of Shintel et al. (2014) in an online format and with slight modifications to the method to make it child-friendly. Participants will be taught the meaning of 20 unfamiliar adjectives with training videos (e.g., “This one is nelch”) to demonstrate sharp by showing a sharp pencil and a dull pencil). Each adjective will be taught three times. Following training, half of the participants will be given a 10-minute delay, and half will be tested immediately. All participants will complete an explicit memory task (i.e., Does nelch mean sharp? Click yes or no.) and an implicit memory task (i.e., Click on the one that is nelch.) where they are asked to select the correct image. Previous research has shown congruent prosody improves memory in adults, and the current research will extend that to examine the effects prosody has on children’s memory for new words.
Women in the Mexican Revolution: Feminism on the March

REBECCA GAGER

Faculty Sponsor: Alcira Dueñas, PhD (History)

Category: Completed Research, Oral

Abstract: Mexican women provided the words and actions necessary to support the men fighting the Mexican Revolution, sometimes literally on the front lines. Soldaderas, the mythical Adelitas of song and poem, were generally poor, often indigenous, women who followed their husbands and partners into the war. They worked as the unseen hands of the armies: fighting, nursing, cooking, and otherwise looking after the needs of their soldier. Some soldaderas also bore arms and participated in combat. Middle and upper-class women, such as Leanor Villegas de MagnÁ, made the war intellectually possible through social activism, and practically possible by founding and running schools, hospitals, and care organizations. Other upper-class women, though generally conservative, traditional, and pro-clerical, also found a voice during this period, and high-toned women’s organizations like Las Damas Catolicas were a driving force behind the pro-Church Cristeros Rebellion. Whether they took the same political side, or considered themselves feminists or not, women in the Revolutionary period were actively involved in deciding what a future Mexico should look like.

Research on this topic included first- and second-hand sources, written mostly by women, on the legal and social standing, workforce presence, and power and influence of women before, during, and after the Revolution. This research yielded an enormous amount of proof that the Mexican Revolution was possible because of the contribution of Mexican women from all social classes and backgrounds.
You believe What? Relational Closeness and Belief Relevance Predict Conspiracy Belief Tolerance

SOPHIA R. MUSTRIC

Faculty Sponsor: Bradley M. Okdie (Psychology)
Category: Completed Research, Oral

Abstract: Conspiracy theory beliefs have increased along with research examining those who hold such beliefs. Yet, few have studied the psychological and situational mechanisms that predict the tolerance of those who hold conspiracy beliefs. Understanding these factors is important as changing conspiracy beliefs requires counter information which is less likely if those who hold conspiracy beliefs are not tolerated (and are excluded or ignored). Tolerance towards those who hold conspiracy beliefs may depend on relationship closeness (e.g., family member) and belief relevancy (i.e., the likelihood that the conspiracy belief will impact the lives of those who are socially close to the individual). We investigated these factors using a 3 (Relationship Type: friend, family, co-worker) by 2 (Relevance: relevant or not) cross sectional design. Participants (n=450) were randomly assigned to report how tolerant they would be to a friend, family member or acquaintance who held conspiracy beliefs which were either relevant (face masks are ineffective) or not relevant (the Lochness Monster is real). We predicted people would be more tolerant of relationally close others who held conspiracy beliefs compared to relationally distant conspiracy belief holders. Additionally, we predicted tolerance would be greater when the conspiracy beliefs were less relevant (compared to more relevant). Finally, we predicted that people would be most tolerant towards those who hold conspiracy beliefs when they are relationally close and when the conspiracy belief is not relevant.

The data for this project is collected and analysis is underway. If the hypotheses are supported, these data will provide insight into when those who hold conspiracy beliefs are likely to be tolerated versus excluded. This is important as excluded individuals (i.e., those who are not tolerated) are more willing to join new groups and are often the targets of extremist groups.
The Silent Speaker: The Impact of Emojis on Nonverbal Communication During a Pandemic

ABIGAIL SEDZIOL

Faculty Sponsor: Melissa K. Jungers (Psychology)

Category: Completed Research, Oral

Abstract: Over this past year, the COVID-19 pandemic forced many Americans to shift their style of communication. Due to an increase in online-communication, individuals are missing out on prosodic cues, or cues that come from someone’s voice patterns, which help give meaning to sentences. Some examples of prosodic cues include pitch, rhythm, stress and pausing. Since texts have no prosody, many people use emoticons to convey meaning. This study examined if emoticons (emojis) influenced sentence interpretation and whether individuals were using emojis differently during the pandemic. Introductory psychology students (n=98) took an online survey that assessed emoji usage and tested participants’ sentence ratings as more positive or negative depending on the presence of a smiley face emoji, a frowny face emoji or no emoji.

This study found that a majority of the participants used some emojis in their daily text messages. Many participants reported no change in emoji usage or perception of emotions, but when asked to give details, they reported using less positive (smiley) emojis and more sad and crying emojis. A repeated-measures ANOVA revealed significant differences between the interpretation of sentences depending on the emoji (smiley, frowny, no emoji) and on the familiarity of the person who sent it (familiar/unfamiliar).

The findings in this study revealed that emojis can change the interpreted emotion of a sentence. Sentences with a smiley emoji were perceived as most positive and texts from familiar people were also perceived as most positive. This is important because individuals may be having a hard time portraying their intentions over text during this time of decreased face-to-face communication. Emoticons may be similar to prosodic cues, in that they help reveal the intentions behind someone’s sentences, which could help remove ambiguity in online communication.