4-20-2022

2022 Program: Honors Student Symposium

University of Dayton. University Honors Program

2022 Honors Student Symposium Presentations

1:00 p.m.

Laura L. Bender
Majors: Pre-Medicine and Philosophy

1:00 pm, Room 207
Loan Bui, Ph.D., Thesis Advisor
Biology Department

Studying Biomarkers of Migrating Glioblastoma Multiformes on a Microfluidic Device

Glioblastomas (GBM) are among the most deadly, aggressive, and untreatable types of cancer. Patients diagnosed with GBMs have the average survival time of 12-15 months. In addition, GBM cells are highly infiltrating, which results in a high risk of cancer recurrence after treatments. Many research studies have been performed to obtain insight into the oncogenesis, progression, as well as cellular characteristics of this detrimental cancer. However, due to its high heterogeneity, it remains a challenge to identify biomarkers that can target aggressive GBM cells. In this study, my goal has been to generate a migrating cell model of a GBM in a microfluidic device in order to identify key biomarkers that are associated with cancer migration. By using the nonadherent method and soft-lithography technique, I have been able to fabricate three-dimensional GBM spheroids with sprouting cells entering the microchannels. This model allowed me to investigate various biomarkers relating to cell motility, cell-cell adhesion, and cancer stem cell behaviors. This project will set the groundwork for future development of novel therapies to inhibit GBM migration; thus prevent the onsets of GBM infiltration and recurrence.

Catherine E. Hawkins
Major: Biochemistry

1:00 pm, Room 211
Shawn Swavey, Ph.D., Thesis Advisor
Chemistry Department

Water Soluble Luminescent Dye as a Potential Photodynamic Therapy Agent

This project consists of the development of water-soluble luminescent dyes to be used as potential photodynamic therapy (PDT) agents for the treatment of cancers and bacterial infections. Photodynamic therapy involves the combination of light energy with a drug, called a photosensitizer, to destroy diseased cells, like cancerous cells and infections. The photosensitizer is activated by a specific wavelength of light. After this light activation, the nontoxic photosensitizer becomes toxic to the targeted tissue.

Eleni Papastratakos
Major: Health Science

1:00 pm, Room 222
Anne Crecelius, Ph.D., Thesis Advisor
Health & Sport Science Department

Vascular Function and Sugar Sweetened Beverage Consumption in Hispanic and Non-Hispanic Males

Sugar sweetened beverages (SSBs) account for a significant portion of daily caloric intake for many individuals, especially Hispanic males. Hispanic males also have one of the highest rates of obesity in the

United States. Both factors put Hispanic males at an increased risk of cardiovascular disease. The purpose of this study was to assess the differences between vascular function in the Hispanic male population and the non-Hispanic male population, and the cause for any differences. The diets of the participants were evaluated specifically to identify SSB intake. Vascular function was determined by post-occlusion reactive hyperemia using venous occlusion plethysmography. Additionally, physical activity and medical questionnaires were administered. No significant differences were found in peak forearm blood flow, peak forearm vascular conductance, or in the dietary and physical habits between participants. Thus, we conclude that in this population, ethnicity alone has limited impact on vascular function and dietary, and physical activity behaviors. Rather, additional environmental and lifestyle factors play a more significant role in the determination of vascular function.

Sebastián M. Quiñones

Majors: History and English

1:00 pm, Room 310
William Trollinger, Ph.D., Thesis Advisor
History and Religious Studies Departments

The Hidden History of Puerto Rico's First War: The Taíno Rebellion According to Juan González

I challenge the traditional conquest narrative that presents the conquest of the Caribbean island of Puerto Rico as a quick and easy affair. Through the summary and analysis of the Probanza of Juan González, a testimonial document from 1532, I argue that rather than a quick and easy victory, the Conquest of Puerto Rico was a brutal and drawn-out affair.

Katharine L. Schreyer

Majors: Music and History

1:00 pm, Room 312
Michelle Hayford, Ph.D., Thesis Advisor
Theatre Department

Dayton is Burning: A Survey of Drag Performance and History in Southwest and Central Ohio

The history of drag performance is long and multifaceted, but there is still more research to be conducted about modern drag performers. Locally, this history can be found in both the archival records of newspapers and other print sources, and in the oral histories I have collected from current local drag performers. My research compiles both sources of information to create a comprehensive history of drag in Dayton and the surrounding areas and show the connections between drag performance across time periods.

1:20 p.m.

Grazia M. DiPierro

Major: Psychology

1:20 pm, Room 311
Erin Kunz, Ph.D., Thesis Advisor
Psychology Department

Investigating the Relationship between Identity Salience and Attitudes about Groups

This project examines the relationship between identity awareness and sexism. Political views can be influenced by identities, including race and gender. Recent trends show that people of color tend to vote more liberally, while white people tend to vote more conservatively. This suggests that people with a minority identity (eg. Black, female) vote with the intention of elevating the status of that social identity. However, in the 2016 and 2020 presidential elections, almost half of white women aligned with their interests as a white person (majority identity) over their gender (minority identity). This may be because women were more aware of their white identity when they voted. Research also suggests that sexism was a strong predictor of support for Trump in both women and men. Internalized sexism, the idea that women are sexist toward other women, may also explain why white women's attitudes reflect a prioritization of race over gender.

Paige M. Kompa
Major: Pre-Medicine

1:20 pm, Room 222
Anne Crecelius, Ph.D., Thesis Advisor
Health & Sport Science Department

Effects of Systemic Hypoxia on Motor Control Performance and Brain Blood Flow in Healthy, Young Humans

The brain is an oxygen dependent organ of the human body and adequate blood flow is imperative. To maintain adequate blood flow in response to low-oxygen (hypoxic) air environments, vasodilation occurs. Fine motor control skills are essential, particularly for in-flight piloting. In this study, a joystick was used to measure the success and quickness of the motor control task presented to the participant. Despite the possibility of encountering hypoxia in flight conditions, there is a lack of data on how motor control may be impacted by hypoxia and the corresponding changes in brain blood flow. We hypothesized that motor control would be impaired during hypoxia, despite increased cerebral blood flow. The central goal of this thesis is to demonstrate the effects of systemic hypoxia on motor control performance and brain blood flow in a young and healthy population.

Maya R. Leibold
Major: Human Rights Studies

1:20 pm, Room 310
William Trollinger, Ph.D., Thesis Advisor
History and Religious Studies Departments

The Jewish Organizations Fighting Fascism in the United States

Recent years have shown a rising trend in fascist and antisemitic actions and attitudes in the United States. In response to this trend, communities have organized into various nongovernmental organizations (NGOs) committed to mobilizing people to combat fascism and antisemitism as they see it. An analysis of these organizations' methods and varying degrees of success will offer a blueprint for future action against fascism. Due to their historical connection to this type of mobilization against fascism, this research will be focused on Jewish-led and organized NGOs. NGOs are often the first to call attention to actions by groups and states that violate citizens' human rights and are therefore useful resources in determining the state of human rights. By analyzing these NGOs, the scope of the rise of fascism and antisemitism will be illuminated as well as which methods are best to overcome this unwanted drift and to promote peace.

Elizabeth R. Mancz

Major: Medicinal Pharmaceutical Chemistry

1:20 pm, Room 211
Shawn Swavey, Ph.D., Thesis Advisor
Chemistry Department

New Boron Dipyrromethene (Bodipy) Dyes as Conjugated Antibody-Fluorophores

The recent technical exploitation of fluorescence has innovated the use of light emittance. Fluorescent techniques in clinical settings and laboratory research grant observation of cellular composition and the analysis of biomolecular interactions. Fluorescent markers are currently sold commercially for exuberant prices. In this project, new fluorescent molecules are developed and synthesized to maximize efficiency and reduce cost. The ease of these new syntheses will allow labs access to conjugated antibody-fluorophores to observe and analyze the composition of samples, as well as interactions between various biomolecules within living cells, including proteins, nucleic acids, and lipids.

Brigid M. Morgan

Major: Biology

1:20 pm, Room 207
Chelse Prather, Ph.D., Thesis Advisor
Biology Department

Ain't No Sunshine When They're Gone: Pollinators in a Solar Prairie

The solar array at Curran Place in Dayton, Ohio is home to many communities of pollinators and wildlife in the restorative prairie that was planted under the panels in 2019. My research aims to answer the following questions: What is the composition of pollinators using this solar prairie? How are the solar panels affecting the pollinators? Routine maintenance of the solar prairie may also be affecting the pollinator community. The results of my research will be able to show how renewable and sustainable energy resources are impacting the wildlife in the area. So far, it seems like the distribution and abundance of pollinators differ between locations in between rows of solar panels and outside of the panels, but solar panels are not harmful to the pollinators.

1:40 p.m.

Julia E. Gallenstein

Major: English

1:40 pm, Room 310
Katrina Kittle, MFA., Thesis Advisor
English Department

The Best Four Years of Your Life

Julia's project emerged from her experience writing a mini-memoir in her creative nonfiction course with Professor Kittle. She decided she did not want the project to end with the submission of her assignment, so she sought to make her mini project into full memoir. She read memoirs and instructional work in order to expand her knowledge on the craft. Her project divulges her personal experience during her four years at college. She provides insights on topics such as sexual assault, trauma, and friendship.

Nicole A. Hetrick
Major: Pre-Medicine

1:40 pm, Room 222
Anne Crecelius, Ph.D., Thesis Advisor
Health & Sport Science Department

Neurocognitive Capabilities and Physiological Responses to Cognitive Stress as well as General Health and Fitness Measurements in Competitive Gamers Versus Non-Gamers

This research dives into the world of Esports to study the potential physiological, cognitive, and fitness variations among competitive gamers and non-gamers. In this study, gamers and non-gamers had their physical activity accounted for to remove physical fitness as a potential confounding variable to the results. The study involved six different cognitive tests. During these cognitive tests, sympathetic nervous system activity was monitored through heart rate, blood pressure, and respiration rate measurements. This was studied in order to see how the different groups responded to the stress load of the cognitive assessments. After completing cognitive testing, each subject's health-related fitness components, skill-related fitness components, and body anthropometrics were measured. All of this data was then utilized to see potential variations in cognitive skills and stress responses between gamers and non-gamers when fitness is accounted for.

Ryan J. Maguire
Major: Chemistry

1:40 pm, Room 211
Vladimir Benin, Ph.D., Thesis Advisor
Chemistry Department

Development of Melamine Derivatives as Potential Reactive Flame Retardants for Thermoplastic and Thermoset Polymers

Melamine is a substance with a well-known and utilized potential as a flame retardant. The goal of this project was to investigate possibilities to convert melamine into derivatives with two primary amino groups, thereby preparing one or more structures analogous to the typical monomers used in the preparation of nylons and other polyamide-type polymers. Our research efforts to date have resulted in the successful derivatization of melamine and the preparation of two bifunctional derivatives. The second part of the project, reacting the derivatives as co-monomers in the preparation of nylon-type polymers, is currently ongoing.

Jason A. Tornes
Major: Pre-Medicine

1:40 pm, Room 207
Pothitos Pitychoutis, Ph.D., Thesis Advisor
Biology Department

Investigating the Role of the Nervous System in Limb Regeneration: A Proteomics Analysis

Regeneration is a biological ability belonging to a small subset of vertebrates including the axolotl, an amphibian that can regenerate its limbs upon amputation. While it is known that the peripheral nervous system plays a critical role in promoting limb regeneration, the potential implication of the central nervous system is largely unknown. Proteomics screening approaches were implemented to compare protein expression data at various time-points into the limb regeneration process following amputation. In this

thesis we identified proteins that are upregulated and/or downregulated throughout limb regeneration and are currently working towards exposing novel protein networks that are activated during this fascinating process.

2:00 p.m.

Olivia G. Clark
Major: Environmental Biology

2:00 pm, Room 207
Ryan McEwan, Ph.D., Thesis Advisor
Biology Department

A Starling in a Pear Tree: Assessing the Influence of Bird Dispersal on Callery Pear (Pyrus calleryana)

Invasive species can disrupt ecosystems and negatively affect other species. Pyrus calleryana (Callery Pear) is an invasive ornamental tree that is spreading quickly throughout the United States. Many studies cite birds as being responsible for spreading Callery Pear by eating the fruit and depositing seeds in new areas. Sturnus vulgaris (European Starling), an invasive bird species, is mentioned in most studies as birds that feed on Callery Pear. Very few other bird species are mentioned. There is little research done on the interactions between birds and Callery Pear despite them having such an important relationship. This study reviews the existing literature on this topic and aims to predict (1) how Callery Pear affects the birds that eat its fruit and (2) which bird species are spreading Callery Pear and further aiding its invasion. The ideas discussed in this study will be useful to future ecological research focusing on invasive plant and bird interactions.

Aileen M. Hull
Major: Sociology

2:00 pm, Room 311
Anya Galli Robertson, Ph.D., Thesis Advisor
Sociology, Anthropology, and Social Work Department

College Students' Opinions on Climate Change: Do Political Views Matter?

Climate change is an ever impending crisis and the politics surrounding the issue are as contentious as ever, especially in the United States where the political culture is extremely polarized. The polarization of the political parties in the United States makes any environmental policy extremely difficult to pass. Meanwhile, the new generation of young people entering the workforce, voting scene, and public eye are bringing new demands to current climate debates. Youth make up a large share of environmental activism participants and opinion polls show climate change is on the minds of many young people. However, there is a lack of research on youth's opinions on climate change as relating to their political affiliation. The purpose of this study is to measure young peoples' views on climate change, while identifying how or if their political identification plays a role. A survey with questions modeled off the Yale Program on Climate Change Communication survey of Climate Change in the American Mind was distributed to 27 undergraduate classes at the University of Dayton. Questions explored political identification and personal belief relating to climate change science, risk, and policy. Using quantitative methods, the results explore how students view these topics and the relationship between their opinions on the environment and their political affiliations and participation. This research is important because

young people will have an impact on both the policies and actions the country takes on climate change as well as trends of Republican and Democrat parties in the United States.

Mary K. Newman
Major: Philosophy

2:00 pm, Room 310
Steve Bein, Ph.D., Thesis Advisor
Philosophy Department

The Theory Behind the Cape: Research on Nietzsche's Super-Man Theory in Concert with DC's Superman Origins and Evolution

My thesis is based in conducting research on the 19th century philosopher Friedrich Nietzsche and his original theory about a Super-Man. I then investigate what the original creators of Superman, Jerry Siegel and Joe Shuster, knew about Nietzsche's theory, if they did at all, and how Nietzsche's ideas are represented in the character whether it be Siegel and Shuster's first attempt at the character, the character that debuted in *Action Comics*, or the Man of Steel we recognize today. Finally, I will address the philosophical questions this research produces such as "What do people's views on Nietzsche's Super-Man theory, whether they recognize it as such or not, say about society?"

Ariana L. Santos
Major: Biochemistry

2:00 pm, Room 211
Justin Biffinger, Ph.D., Thesis Advisor
Chemistry Department

Understanding the Hydrolytic Activity of Papiliotrema laurentii on Polyester Polyurethane Coatings

Though plastic polymers such as polyester polyurethanes have many applications from electronics to aircraft coatings, their resistance to natural degradation presents an environmental concern. Therefore, elucidating the mechanism of degradation from microorganisms that were discovered breaking down the coating of a cargo aircraft may offer insights into a method of bioremediation. To explore this, the fungus Papiliotrema laurentii (one microorganism isolated from this consortium) was cultured in several different media types at different pH levels, and a mix of IR spectroscopy, Raman spectroscopy and fluorescence microscopy was used to monitor its vitality and degradation activity on polymers. In addition, its protein secretions were extracted and analyzed using a variety of electrophoresis techniques, stains and assays in order to identify the proteins capable of the degradation. Finally, the fungus was co-cultured with the bacteria Bacillus megaterium in order to degrade polyether polyurethanes.

2:20 p.m.

Meghan E. Leinhauser
Major: Sociology

2:20 pm, Room 311
Miranda Hallett, Ph.D., Thesis Advisor
Anya Galli Robertson, Ph.D., Thesis Advisor
Sociology, Anthropology, and Social Work Department

TikTok & the Missing and Murdered Indigenous Women, Girls, and Two-Spirit People Movement

The purpose of this study is to analyze the Missing and Murdered Indigenous Women, Girls, and Two-Spirited People (MMIWG2S) social movement via content analysis and interviews. The study includes analyzing videos posted to the social media platform, TikTok, and interviews with a collection of users who post videos about MMIWG2S. TikTok uses a unique algorithm to tailor users' feeds based on the types of videos with which they watch and interact. This allows for the creation of an online community that shares common interests with one another, especially in a time where communication methods have changed significantly. Analyzing videos related to the movement allows for emergent themes and trends to be found within the posts. Doing so aids in understanding what these individuals want the general public to know about a movement that means so much to them. The subsequent interviews allow for a deeper comprehension of the role social media, specifically TikTok, plays in responding to the MMIWG2S social movement.

Kathleen T. McCaslin
Major: Pre-Medicine

2:20 pm, Room 207
Madhuri Kango-Singh, Ph.D., Thesis Advisor
Biology Department

A Drosophila Colon Cancer Model to Study Interactions between Oncogenic Pathways

Colon cancer is one of the leading cancers in the United States, and affected patients face a five-year survival of less than 60% (Labianca, 2010). While the primary treatment is surgery, chemotherapy is used in severe cases. Both of these options are invasive and kill healthy cells along with cancerous cells. This project aims to generate a genetic model for colorectal cancer (CRC) in Drosophila and then test the activity of Hippo and Wingless/Wnt signaling pathways, which are the two cancer promoting pathways most commonly disrupted in CRC (Li, 2019). This thesis takes a closer look at the growth profile of the cancer, and explores the pharmacological treatment that could affect cancerous cells resulting from some of these most frequent oncogenic pathways. Findings from Drosophila models can be extrapolated to higher vertebrate models and tested for their therapeutic value in mammalian cells and patient samples.

2:40 p.m.

Conor J. Faulhaber
Major: Mechanical Engineering

2:40 pm, Room 211
Joshua Heyne, Ph.D., Thesis Advisor
Mechanical and Aerospace Engineering Department

Optical Dilatometry Measurements for the Quantification of Sustainable Aviation Fuel Materials Compatibility

As ground transportation becomes more sustainable with the advancement of electric vehicles, the commercial air travel industry will see its contribution to greenhouse gas emissions continue to grow. The best near-term opportunity to reduce these emissions and increase performance is the implementation of sustainable aviation fuels, or SAFs, derived from renewable sources rather than the fossil fuels used in making conventional jet fuels. Currently, SAFs are limited to 50% blends with conventional jet fuels due to materials compatibility issues with elastomer O-ring seal swelling in fuel systems causing fuel leakage. This study begins to address this problem by using optical dilatometry test methods to measure O-ring

seal swell in various fuels and aviation hydrocarbon compounds. These measurements will aid efforts to develop a predictive model for elastomer O-ring seal swell based on fuel composition. The ultimate goal of this work is to provide recommendations to SAF producers to create materials compatible fuels capable of 100% implementation, thus advancing the use of SAFs in the commercial air travel industry and reduce its contribution to climate change.

Ryan D. Greensfelder

2:40 pm, Room 312

Major: Economics

Joseph Duggan, Ph.D., Thesis Advisor
Economics and Finance Department

Labor Trends in Nuclear Energy and Developmental Obstacles in Nuclear Energy

The idiosyncrasies that exist in the United States independent system operator's structure poses many unique challenges to wholesale energy markets. The array of energy production solutions is one of these challenges to understanding energy markets. Numerous tools have been used to measure the quantitative complexity of energy markets. Few tools and indices exist to track macroeconomic fluctuations in US employment and wage for United States relative to the cost of energy delivery. In modelling the derived labor demand for energy employment, we should be better able to explain markets and allow for predictions in fluctuations in the labor market. This research looks to answer questions such as: How volatile is the nuclear energy labor market? What trends exist in employment? How do changes in wage equate to the increase in variable and indirect costs for nuclear energy plants? How are these costs ultimately passed down to consumers?

3:00 p.m.

Lauren E. Durham

3:00 pm, Room 310

Majors: English and Communication

Patrick Thomas, Ph.D., Thesis Advisor
English Department

"You can disagree without being disagreeable": A Rhetorical Study of Twitter Discourse about Justices Ruth Bader Ginsburg and Amy Coney Barrett

On Sept. 18, 2020, Supreme Court Justice Ruth Bader Ginsburg passed away at age 87. The world reacted to her passing in a multitude of ways, and in the midst of the 2020 presidential election, Donald Trump nominated Judge Amy Coney Barrett as Ginsburg's successor. After two days of hearings, Barrett was approved by the Senate on October 22, 2020. This six-week time period between Ginsburg's death and Barrett's ascension to the Supreme Court provides a snapshot of public discourse regarding women in power, collective memory, and the implications of social media amidst political uncertainty. In treating the thousands of collected tweets as primary texts, this project aims to uncover the ways in which Ginsburg and Barrett are rhetorically linked to one another. I will argue that although the two women are portrayed as polar opposites, points of conversation for Twitter users point to the similarities the women share.

Allison E. Herceg
Major: Biology

3:00 pm, Room 207
Yvonne Sun, Ph.D., Thesis Advisor
Biology Department

Cellular Infection by Listeria monocytogenes Strain 07PF0776

L. monocytogenes is a food borne pathogen that can pass through the intestinal wall and live inside immune cells while it spreads throughout the body. It is currently understood that *L. monocytogenes* is able to enter into the heart from the intestines, however this aspect of infection is not clearly understood. A specific strain of *L. monocytogenes*, strain 07PF0776, that can cause life-threatening heart infection has been isolated and provides us with an opportunity to determine the mechanisms underlying *L. monocytogenes* infections in the heart. Our lab previously showed that short chain fatty acid (SCFA) mixtures exhibit regulatory activities on the ability of *L. monocytogenes* to cause infections. To further dissect the role of SCFAs, I intend to determine the effects of prior anaerobic exposure of SCFAs, specifically propionate, on strain 07PF0776, focusing on how propionate affects the ability of strain 07PF0776 to cause infections.

Erika L. Moeller
Major: Psychology

3:00 pm, Room 311
Susan Davis, Ph.D., Thesis Advisor
Psychology Department

Healthy Eating, Unhealthy Mind: Measuring the Rate of a Disordered Eating Pattern among University of Dayton Student Athletes versus Non-athletes

Orthorexia Nervosa (ON) is a disordered eating pattern characterized by an unhealthy obsession with eating healthy foods. Unlike other eating disorders such as Anorexia Nervosa and Bulimia Nervosa, people with ON are concerned about the quality of their food rather than the quantity, and their goal is overall health instead of losing weight. The condition is currently not clinically diagnosable, so there is more than one tool that exists to measure whether someone has tendencies of ON. Previous studies have shown a possible relationship between exercise volume and ON symptoms, so this study measures the prevalence of ON among student athletes versus non-athletes on our campus, using two different diagnostic tools.

3:20 p.m.

Hannah M. DeRespiris
Major: Pre-Medicine

3:20 pm, Room 207
Yvonne Sun, Ph.D., Thesis Advisor
Biology Department

Identifying the Effects of Propionate on Macrophage Activation during Listeria monocytogenes Infection

My thesis focuses the effects of propionate, a short chain fatty acid, on the infection of macrophages by Listeria monocytogenes. More specifically, macrophage activation states will be assessed through measuring morphology, M1 versus M2 markers, and the production of nitric oxide and IL6. The research

findings will help identify parameters that assist macrophages in resisting and controlling L. monocytogenes infection.

Eric R. Horsting
Major: Chemical Engineering

3:20 pm, Room 211
Judit Beagle, Ph.D., Thesis Advisor
Chemistry Department

Microwave-Assisted Synthesis of Quinoxaline Derivatives

Quinoxaline and its derivatives have been studied extensively for their relevant biological activity and transition metal selectivity. These compounds are commonly used for their antimicrobial, antifungal, antiparasitic activity, and relevance in the treatment of metabolic diseases. More recently, researchers have shifted their research focus to synthetic quinoxaline derivatives. Such compounds are found in many antibiotic medicines like echinomycin and Levomycin as they inhibit gram-positive bacterial growth. Quinoxaline's ability to inhibit gram-positive bacterial growth has been found especially in oxygen-containing compounds, yielding promising candidates to prevent cancerous tumor growth. The breadth of quinoxaline makes it a valuable tool within the research community. We report an improved methodology using microwave-assisted synthesis. This method provides easy access to a wide variety of substitution patterns, in a solvent-free environment with improved yields.

Margaret R. Moore
Major: Music Therapy

3:20 pm, Room 312
Joy Willenbrink-Conte, M.A., Thesis Advisor
Music Department

Recommendations and Advocacy on Building Sustainable Music Therapy Programs in Adult Medical Settings

This thesis aims to advocate and provide recommendations for sustainable music therapy program structures in adult medical settings. A review of the related literature justifies the need for and benefits of music therapy programs in adult medical settings. Recommendations for establishing and growing a music therapy program in these settings are based on semi-structured interviews conducted with three music therapists who have successfully implemented cost-effective and sustainable programs. Important considerations identified for program development include what to incorporate in a development pitch, the workload and wellbeing of the music therapist, and staff perceptions and relationship to the music therapy program.

Breven M. Perry
Major: Health Science

3:20 pm, Room 222
Matthew Beerse, Ph.D., Thesis Advisor
Health & Sport Science Department

Evaluation of Patellar Tendon Load across Sports-Related Activities

Osgood-Schlatter's Disease is a disease of the knee, in which excess bone growth occurs just below the knee cap. Physically active children are at a greater risk. Often, it is a non-painful condition

that does not require surgical intervention from a physician; however, in some cases, the bone growth can be very painful and the individual will need treatment. Treatment typically ranges from resting the affected leg and pain medication to surgery. For individuals suffering from OSD, it is important to be able to determine which activities should be avoided/modified to reduce the pain experienced. Using data examining different loads on the knee, we can assess which movements common in sport, should be avoided/modified for athletes that have OSD. This study aims to evaluate pre-collected data of walking, running, jumping, and landing to determine which have the greatest load on the knee from a biomechanical perspective.

3:40 p.m.

Anna L. Biesecker-Mast
Majors: History and English

3:40 pm, Room 310

Ashleigh Lawrence-Sanders, Ph.D., Thesis Advisor
University of Colorado Boulder, History Department

Narratives of the Black Mother in the U.S.: Exploring the Black Maternalist Framework in Black Activism

My historical research seeks to reveal how exactly White European notions of Blackness, womanhood, and motherhood (and the intersections of all three) were inscribed onto the lived experiences of enslaved women and mothers—and then, after emancipation and abolition, onto the lives of Black women in the United States up through the present moment. What emerges from a critical analysis of archival omissions are Black women's voices and experiences—who demonstrate over and over that they resisted and are resisting. I argue that looking at this history through the Black Maternalist framework reveals that motherhood characterized these women's resistance from the voyages across the Atlantic to modern civil rights and reproductive rights movements. Furthermore, I will demonstrate how other people's rhetorical use of Black motherhood does in fact construct the lived experience of these women and creates a tension between the "ideal" Black mother and those that don't fit into the narrative.

Claudia N. Dominique
Major: Psychology

3:40 pm, Room 311

Melissa Layman-Guadalupe, Ph.D., Thesis Advisor
Psychology Department

Social Media Usage during COVID-19: Friend or Foe?

The broad goal of the current study is to highlight the relationship between social media usage and mental health among college students. In addition, the study also evaluated students' self-reported changes in their mental health and social media usage as a result of the COVID-19 pandemic. Specifically, the current study utilized online surveys to collect data on individuals' perceived impact of the pandemic on their social media behavior, and subsequently, their overall mental health. This research will contribute to our knowledge about mental health among college students by providing greater insight into the psychological state of students today, thus allowing future researchers to address the mental health concerns of those who have lived through a global pandemic.

Sally M. Gibson
Major: Music Therapy

3:40 pm, Room 312
Susan Gardstrom, Ph.D., Thesis Advisor
Music Department

A Comparison of Music Therapy Approaches Utilized with Children and Adolescents with Autism Spectrum Disorder (ASD)

Music therapy is a practice wherein music is used in the context of a therapeutic relationship to address client needs relating to their physical, emotional, cognitive, social, and spiritual wellbeing. Two contrasting approaches to treatment within the practice of music therapy are *outcome-oriented* and *experience-oriented*. Both of these approaches aim to provide opportunities for clients to reach their clinical goals, but the planning and implementation of therapy is different from each approach. The purpose of this project was to examine how these orientations are represented in the professional literature related to Autism Spectrum Disorder (ASD). The presentation begins with a description of ASD and an account of how music therapy has historically been employed with individuals with ASD. This is followed by a detailed explanation of outcome-oriented and experience-oriented music therapy and why each approach is used in clinical practice. Findings from the literature review may inform future practice relating to effective treatment of ASD and suggest areas for further research.

Nathan J. Holthaus
Major: Biology

3:40 pm, Room 211
Madhuri Kango-Singh, Ph.D., Thesis Advisor
Biology Department

AZD3759 Inhibition of Glioblastoma Multiform Progression in Drosophila Melangoaster Model

Using a fruit fly model, brain cancer progression was researched in relation to the addition of varying concentrations, or amounts, of a drug from the class of cytosine-kinase inhibitors, AZD3759.

Grace K. Lowe
Major: Health Science

3:40 pm, Room 222
Sabrina Neeley, Ph.D., Thesis Advisor
Health & Sport Science Department

Exploring Risk Factors for Maternal Mortality: A Qualitative Study

This qualitative study will be exploring community-level interventions to decrease risk factors for maternal mortality. This will be done by identifying risk factors associated with maternal mortality through prior data collected by the Ohio Department of Health's Bureau of Maternal, Child, and Family Health. These risk factors will then be compared to responses from various community health workers in the Dayton, Ohio area. This is an important project because it identifies the most prevalent risk factors that lead to maternal mortality

Rebecca M. Rudd

Major: Biology

3:40 pm, Room 207
Yvonne Sun, Ph.D., Thesis Advisor
Biology Department

Identifying the Effects of Anaerobic and Propionate Exposure on Listeria monocytogenes Infection in the Central Nervous System

The foodborne pathogen *Listeria monocytogenes* is capable of crossing the gastrointestinal (GI) epithelium and crossing the blood brain barrier to cause bacterial meningitis. In this project, the goal of the research is to determine how anaerobic exposure, a typical process during infection, and propionate exposure, a common fatty acid in the body, affects *L. monocytogenes* invasion of the central nervous system. In the first aim, Neuro-2A cells, acting as the model host cell for neuronal cells, will be grown and infected with *L. monocytogenes* that will be exposed to anaerobic or aerobic conditions, as well as propionate versus no propionate conditions. The results will show the effect anaerobic and propionate exposure has on invasion success and intracellular growth. In aim two, biochemical tests are used in order to test differences between *L. monocytogenes* strains and the same conditions as above to determine how anaerobicity and propionate biochemically affect *L. monocytogenes*. From these results, we will identify intestinal conditions that can potentially influence *L. monocytogenes* neural invasion to better understand this particular pathogenic process.

4:00 p.m.

Rachel M. Dalrymple

Major: Music Education

4:00 pm, Room 312
Patrick Reynolds, D.M.A., Thesis Advisor
Music Department

Connecting Compositions of Gustav Holst: Folk Songs and The Planets

Gustav Holst, a British composer from the early 1900's, is most well-known for writing "The Planets," an orchestral suite with movements for each of the planets and their corresponding astrological personalities. A significant portion of Holst's lesser-known compositions were based on British folk songs. In my thesis, I am exploring the connections between Holst's folk song-based pieces and "The Planets" in terms of the compositional devices of meter, tonality, orchestration, and melody. These compositional devices are threads that connect both types of pieces together and define Holst's characteristic style.

Isabella K. Fusillo

Major: History

4:00 pm, Room 310
Bobbi Sutherland, Ph.D., Thesis Advisor
History Department

Tracing Stigma: The Evolution of the Tattoo in the Middle Ages

In the Western world, tattooing began as a mechanism for marking slaves and prisoners in Ancient Greece and Rome. The Middle Ages is when we see the transformation of the tattoo from something that

was forcibly done to represent a communal identity into a individual expression of self. This project traces the use and meaning of tattooing from the ancient world into the late 1700's.

Mackenzie T. Martin
Major: Pre-Medicine

4:00 pm, Room 207
Yvonne Sun, Ph.D., Thesis Advisor
Biology Department

The Kinetics and Mechanisms Regulating the Impact of Anaerobic Exposure on Listeria monocytogenes Pathogenesis

This project investigates the role of propionate and oxygen levels in the growth and spread of Listeria monocytogenes. The pathogen Listeria monocytogenes causes a severe foodborne illness called listeriosis. The CDC estimates that listeriosis impacts up to 1,600 people a year, disproportionately affecting elderly, pregnant, and immunocompromised individuals. Therefore, it is important to understand the mechanisms underlying how this pathogen causes infections. This project aims to identify how exposure to propionate, a short-chain fatty acid naturally produced in the gut during digestion, and different oxygen levels can change how well Listeria monocytogenes infects cells. Additionally, this project investigates FNR/CRP transcriptional regulators and their role in how Listeria monocytogenes adapts to a low oxygen environment.

Jordan N. McCormick
Majors: Secondary Catholic Religious Education / Religious Studies

4:00 pm, Room 311
William Trollinger, Ph.D., Thesis Advisor
History and Religious Studies Departments

Behold Your Mother: Wives and Mothers as Partners in Christ's Priestly Mission

This project explores the Catholic Church's teaching on the priesthood of the laity and specifically how the lay priesthood of women, as wives and mothers, works in tandem with and compliments the ordained priesthood. The concept of lay priesthood is rooted in our baptism - where we are invited into and given the power to participate in Jesus Christ's priesthood through our own prayers and sacrifices, our ministering to others, etc.

In my study, I've included five lay women from around the 19th and 20th centuries who are either canonized saints in the Church or who are on their way to canonization. Although these women, for example, cannot distribute the sacraments or absolve sins, my work explores how - in their motherly mediation, their own prayers and offering of their sacrifices, and their giving life literally and spiritually to the Church - they too have a share in Christ's priesthood.

4:20 p.m.

Joseph G. Beckett
Major: Mechanical Engineering

4:20 pm, Room 211
Robert Lowe, Ph.D., Thesis Advisor
Mechanical and Aerospace Engineering Department

Development of a Stereo Digital Image Correlation System for Large Deformation Soft Materials Testing

Stereo digital image correlation (DIC) is an optical measurement technique capable of producing contour plots of 3D deformations. These rich measurement capabilities – namely, the ability to capture local shape and volume changes in specimens undergoing complex 3D deformations during mechanical testing – make DIC a compelling research tool for characterizing the mechanical properties of numerous classes of materials. Soft materials, which typically exhibit large strains at fracture, present several major challenges to DIC measurements including pattern breakdown, saturated image regions from glare, and large fields of view. In this research, a DIC system is designed to overcome these obstacles in a cost-effective manner using commercially available equipment and Digital Image Correlation Engine (DICe) open-source processing software. High-aspect-ratio image sensors, cross polarization, and custom DIC patterning stamps are utilized to improve DIC imaging quality. Ongoing work is focused on implementing stereo DIC capabilities and validating the DIC system using multiple coupon-level tests.

Katherine A. Kohnen
Majors: Pre-Medicine and Psychology

4:20 pm, Room 207
Thomas Williams, Ph.D., Thesis Advisor
Biology Department

Challenging Genetic Dogma: Testing Whether Modularity is a General Feature of the Switches that Control Animal Gene Use

Animals build, organize, and maintain a diversity of cell types throughout development and adulthood. Cellular diversity results from the regulated expression of genes, where most genes are “pleiotropic” with expression occurring in several cell types and/or developmental stages. Cell type and developmental stage-specific patterns of expression are activated by cis-regulatory element (CRE) DNA sequences. In contrast to genes, CREs are generally assumed to function in a modular, non-pleiotropic manner. The central goal of this thesis is to begin an exploration of whether CREs tend to be modular or possess pleiotropic gene expression regulating activities using Drosophila melanogaster as the model organism. A series of genetic experiments will provide a novel tests of the modularity hypothesis and provide insights into how expression patterns are encoded in CREs. The outcomes have broad implications in biology, notably on the roles of CREs in development, evolution, and genetic disease.

Elena J. Niese
Major: Adolescent to Young Adult Education

4:20 pm, Room 311
Timothy Gabrielli, Ph.D., Thesis Advisor
Religious Studies Department

Towards a Pedagogy of Beauty: The New Evangelization, the English Classroom, and Renewal of the Catholic School

Evangelization, or the proclamation of the Gospel, has been inseparable from the call to Christian life since its onset. However, in an increasingly secular and globalized world, evangelization cannot look the same as it once did. In 1975, Pope Paul VI addressed this need for renewal, calling for a “New Evangelization.” Subsequent popes, including Pope John Paul II and Pope Francis, have continued to place the New Evangelization at the forefront of their initiatives. Yet, what exactly is the purpose and meaning of this Catholic "buzzword"? And what impact does it have upon the role of Catholic educators,

specifically those in the English classroom? This thesis will trace the evolution of the New Evangelization from its conception to today, proposing how the English educator within the Catholic school can specifically live out the call of the New Evangelization through a renewed emphasis on beauty within classroom instruction.

Derek C. Olson
Major: Economics

4:20 pm, Room 312
Nancy Haskell, Ph.D., Thesis Advisor
Economics and Finance Department

Job Diversity and its Impact on Intergenerational Mobility at the County Level

My thesis explores whether the diversity of industries within the county a child grows up in has an effect on the income mobility of these children. This research is based heavily on the previous work of Dr. Raj Chetty and his team at Opportunity Insights focusing on intergenerational mobility. To address this new area of research, I add a measure of employment diversity across industries within a county. I then also consider a measure of employment concentration in specific industries for these counties. Overall, I find that individuals who grow up in counties with lesser job diversity experience statistically significant improvements in income mobility. Counties with concentrated employment in the manufacturing industry experience statistically significant improvements in income mobility while the reverse is true for the trade, transportation, and utilities industry. This has policy implications for the government in helping improve the outcomes of children in the United States.

4:40 p.m.

Naomi M. Pearson
Major: Psychology

4:40 pm, Room 311
Lee Dixon, Ph.D., Thesis Advisor
Psychology Department

Anxious Attachment as a Mediator in the Relationship between Parental Abuse in Childhood and Partner Attributions in Adulthood

The parenting a child receives can, either positively or negatively, affect their physical and mental health and behaviors in adulthood. When a child experiences abuse or neglect from their caregiver, they often develop inadequate adjustment, due to insecurity in close relationships, which may continue throughout their life. This insecurity, established in childhood, can manifest in adult romantic relationships, as assurance-seeking, jealousy, and hostility, causing insecurely-attached individuals to attribute blame onto their partners. These pessimistic attributions, caused by parental-influenced feelings of ambivalence and separation anxiety, may lead to increased tension and dissatisfaction within close relationships. While existing research links parental abuse/neglect to insecure-attachment and insecure-attachment to attribution within relationships, this study aims to mend the gap between endurance of childhood abuse and attribution, with the mediating role of insecure, anxious attachment. If this link is supported, then it indicates a need for community resources geared toward reversing anxious childhood attachment, which results from abuse.

Jenna R. Rock
Major: Biology

4:40 pm, Room 207
Thomas Williams, Ph.D., Thesis Advisor
Biology Department

Resolving the Gene Regulatory Network for a Fruit Fly Pigmentation Trait Whose Modification may Underlie Climate-Driven Adaptation

My thesis looks at transcription factors in fruit flies and how they modify the pigmentation pattern of the fruit fly abdomen. Transcription factors are proteins that bind to DNA to change how genes are expressed. Alterations to the combination of transcription factors can cause different patterns of expression in flies. By better understanding the network of genes and transcription factors that play a role in fruit fly pigmentation, we can better understand how differences in the network are responsible for climate driven adaptation.