

Honors Student Symposium 2017



arts

business



education



engineering

sciences

UNIVERSITY *of*
DAYTON

Honors Program

The thesis component of the Honors Program

consists of a three-semester, six-credit-hour project that culminates in a significant research contribution, performance or body of creative work.

The Honors thesis project involves a collaboration with one or more faculty members who help direct and focus the student's original thesis topic.

The University Honors Program sponsors the Honors Student Symposium as an opportunity for the students to present their theses to the University community, family and friends.



University Honors Program

presents the

Honors Student Symposium
2017

March 24, 2017
1:00 to 5:00 p.m.
Kennedy Union

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Rocket Technology and Enabling Well-stirred Combustion

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The Patrick F. Palermo Honors Program Founders Fund

provides support for substantive Honors thesis projects "that involve international research, service and leadership in the community, or which advance the realization of a just society."

The awardees for 2016-17 are

Erin Peiffer and Virginia Saurine

The Daniel Arnold Memorial Scholarship

provides a senior-year scholarship for an Honors student from the College of Arts and Sciences who exemplifies Danny Arnold's commitment to research by completing a thesis project.

The awardee for 2016-17 is

Kelsey Clayback

The Berry Summer Thesis Institute

engages a cohort of mid-career Honors students with records of academic success and an interest in research in a 12-week on-campus program.

Thesis students present their research-in-progress at the Honors Students Symposium during their junior year and their final projects as seniors.

The members of the 2017 cohort will be announced

at the Honors Reception on March 24, 2017

1:00 p.m.

Elizabeth A. Abrams

Major: Biology

**Understanding the Effects of Propionic Acid
on *Listeria monocytogenes* Growth, Survival and Virulence**

Listeria monocytogenes is a bacterial pathogen that causes foodborne gastrointestinal illnesses in individuals with weakened immune systems. In the absence of a strong immune system, *Listeria* can cause fatal infection by breaking the intestinal wall and spreading to other organs. Therefore, prevention of fatal infections relies on blocking *Listeria* from breaking the intestinal wall. My work focused on understanding how propionate, a natural intestinal acid in healthy individuals, affects *Listeria's* ability to break the intestinal wall and cause infection. Although we observed inhibitory effects of propionate on *Listeria's* in vitro growth, my results showed that *Listeria* treated with propionate was not compromised in its ability to cause infections. Further research is being conducted to test for protective effects of propionate on mammalian cells by treating the cells with propionate prior to infection. We hope to fully understand the extent of influence propionate has on host-pathogen interactions.

Natalie M. Hunton

Majors: Accounting and
Operations Management

A Case Study on Inventory Costing Systems

Firms use cost accounting to determine the price of a product and to analyze the efficiency of resource consumption. There are several different types of costing systems, but all are comprised of three basic elements: direct materials, direct labor and manufacturing overhead. The purpose of this case study is to analyze and evaluate various costing systems and apply that knowledge to a company in the Dayton area. First, I compiled background research on the various costing systems and the company. I then conducted a site visit and interviews with accountants at the company. Finally, I used the background information and information from the accountants to assess the validity and practicality of each costing method to the company. I also evaluated what changes the company would need to implement to make methods feasible.

1:00 p.m., Room 310

Yvonne Sun, Ph.D., Thesis Advisor
Biology Department

1:00 p.m., Room 312

Marsha Keune, Ph.D., CPA, Thesis Advisor
Accounting Department

Samantha A. Malick

Major: Psychology

**Effects of Playing Computerized versus Tactile Learning Games
on Preschoolers' Attention Skills and Comprehension: A Pilot Study**

The millennial generation is part of the ongoing research debate about the pros and cons of learning with computers versus tactile manipulatives. This study in particular aims to compare preschoolers' attention skills and comprehension based on whether they play a learning game as a tactile board game versus a computerized game. I examined a small sample of preschoolers playing a computerized versus hands-on learning game. In order to compare their attention skills and comprehension, I counted how long they held their gaze, the number of times they looked away from the task and the number of errors they made. I hypothesized that children's visual attention would be greater and distraction would be fewer when they play the computerized game. I further hypothesized that children would have a greater understanding of the game when it is a tactile board game.

Stephen T. McFadden

Major: Mechanical Engineering

**Design and Protocol for the Utilization and Setup
of a Low-cost Slip Trainer for Fall Prevention**

Recently, the idea of a "fall vaccine" has been studied as a way to proactively rehabilitate and possibly prevent falls for older adults. The effects created by a slip trainer, which is a device designed to recreate a falling situation safely in order to train a patient's reflexes, was carried over for more than a year and led to a reduction in falls. However, the facilities to perform this kind of training are only accessible in certain labs and the equipment therein is also extremely expensive, so not many doctors' offices or local therapy centers could afford to purchase such devices. There is therefore a need to design a reduced-cost and more accessible slip trainer which functions analogously to the current lab setups. Mass Rehab Inc. has already developed a prototype of a manual slip trainer. Considering the manual nature of this prototype, the consistency and assessment capabilities of that slip trainer are limited. In addition, an effective slip trainer needs to have the capability to provide a consistent and repeatable slip depending on the heights, weights and abilities of the patient. The objective of my research is to modify this existing slip trainer into a low-tech, mechanically-controlled device which allows for repeatable slips and reliable assessment of a patient's abilities. Other aspects of my research is to gain an understanding of the relation between the magnitude of the slip and the weight on the trainer to maximize the effectiveness of the slip trainer, to provide guidance for future studies in this area and to begin to relate the weight on the board to the type of reaction we might observe patients utilizing in reaction to a sudden slip.

1:00 p.m., Room 207

Mary Fuhs, Ph.D., Thesis Advisor
Psychology Department

1:00 p.m., Room 211

Kimberly Bigelow, Ph.D., Thesis Advisor
Mechanical and Aerospace Engineering Department

1:20 p.m.

Kathleen D. Golterman

Major: Psychology

The Influence of Women's Self-esteem on Mating Decision-making across the Menstrual Cycle

The proposed study seeks to determine if self-esteem has an influence on the decision-making process of choosing a mate. When women are ovulating, they are more attracted to men who are physically attractive and have strong genes in an effort to ensure reproductive success (i.e., a strong, healthy offspring). However, these men are typically unwilling to commit to any one woman and lack the desire for a committed relationship. However, recent research finds that when women are ovulating, they erroneously perceive attractive, genetically-strong men as more willing to commit to them as long-term partners (Durante, Griskevicius, Simpson, Cantu, & Li, 2012). The proposed study extends this research by examining the role of women's self-esteem in mating decisions. Women with high self-esteem may be more likely to perceive attractive, genetically-strong men as more willing to be in a committed relationship, whereas women with low self-esteem might have more accurate appraisals of his commitment level.

M. Colleen McDaniel

Majors: Psychology and
Women's and Gender Studies

Men's Perceptions of Consent in College Campus Acquaintance Rape

Sexual violence is an epidemic on college campuses today. The debate in the psychological community now focuses on who perpetrators of sexual violence are. Some argue that a small percentage of men commit many rapes (e.g., Lisak and Miller, 2002). Others contend that a larger proportion of men commit rape, but on fewer occasions (McWhorter et al., 2010). These diverging interpretations have implications for the role of individual differences in identifying those at risk of offending. This project seeks to uncover the thoughts, evaluations, characteristics and individual differences of college men and the type of college man who might commit sexual violence by measuring participants' endorsement of male gender norms, their acceptance of rape myths, their self-reported coercive sexual behavior history and their evaluations of a hypothetical acquaintance rape scenario.

Lydia C. Payton

Major: Pre-medicine

Investigation of the Role of Mitochondrial Dysfunction as a Trigger for Neurodegeneration in Alzheimer's Disease

Alzheimer's disease is a progressive neurodegenerative disorder that affects cognitive function and memory of the patient. It results from plaques formed by the abnormal cleavage of the Amyloid Precursor Protein (APP), which result in the formation of 42 amino acid polypeptide, also known as amyloid beta 42 (A β 42). Accumulation of A β 42 peptide

1:20 p.m., Room 207

Erin O'Mara, Ph.D., Thesis Advisor
Psychology Department

triggers cell death in the neuronal cell population of the central nervous system. However, the trigger for this abnormal cell death is unknown. A possible explanation involves the role of mitochondrial dysfunction as the trigger for neurodegeneration. Mitochondria are involved in vital cellular functions, including ATP production, calcium ion homeostasis, reactive oxygen species production and apoptosis. Possible areas of mutations in many of these areas are discussed and how each could relate to Alzheimer's mediated neurodegeneration. In addition, areas of future studies are mentioned. In order to investigate these issues, a *Drosophila melanogaster* eye model is used with the Gal4/UAS to misexpress the human A β 42 polypeptide in the photoreceptor neurons of the fly retina.

Erin E. Peiffer

Major: Mechanical Engineering

Rocket Technology and Enabling Well-stirred Combustion

Nearly 3 billion people in the world use biomass stoves for cooking and heating their homes. Due to incomplete combustion, toxic by-products such as soot, nitrous oxides and carbon monoxide (CO) gasses form. These toxic substances contribute to pollution and can lead to serious health issues over time if inhaled, leading to over 4 million deaths per year. The formation of these toxic substances can be mitigated, in large part, by optimizing the combustion process. This optimization can be achieved, in part, through the introduction of increased turbulence intensity allowing for the so called "well-stirred combustion regime." Here we will be exploring the health, environmental and social effects of biomass combustion in the developing world, the benefits of "rocket" technology for cooking and agricultural purposes, and the potential implementation of well-stirred combustion regimes to further improve upon this technology.

Kevin M. Wargo

Majors: Accounting and Finance

Accounting for Change: Assessing the Top-line Implications of New Revenue Recognition Principles

This project presents a detailed study of the conceptual changes and quantifiable impacts tied to recent alterations within the professional accounting landscape. Business revenue results serve as the key financial performance indicator of this study, as they continue to be extremely important to the analysis practices of investors and other financial statement users. The new accounting guidance analyzed throughout this project has the potential to significantly alter the timelines that companies follow when recording revenue from work contracts. Resulting shifts in the timing of revenue recognition could impart significant differences in performance metrics from period to period, and could therefore spark major volatility within the investing environment. To inform investors and heighten their awareness, I studied and measured the possible movement of periodic revenue results as businesses transition away from their established accounting practices and into a new recognition model.

1:20 p.m., Room 211

Joshua Heyne, Ph.D., Thesis Advisor
Mechanical and Aerospace Engineering Department

1:20 p.m., Room 312

Marsha Keune, Ph.D., CPA, Thesis Advisor
Accounting Department

1:40 p.m.

Douglas S. Carey

Majors: Finance and Economics

1:40 p.m., Room 312

Donald Shimmin, M.A., Thesis Advisor
John Ruggiero, Ph.D., Thesis Advisor
Finance and Economics Department

Sustainable Investment Portfolio to Maximize Alpha

The sustainable investment portfolio undergoes two focuses. The first portfolio undergoes a negative screening. This means that the portfolio will completely exclude specific industries and sectors that are deemed unsustainable. The other portfolio will undergo positive screening. This means that we set up specific parameters that focus on green initiatives, but do not exclude any industries or sectors. This still will allow the opportunity for fossil fuel companies and other companies that can pose negative impacts on the environment but they will be the top environmentally-conscience companies in the industry.

Grace E. Hagan

Major: English

1:40 p.m., Room 331

Joseph Pici, M.A., Thesis Advisor
English Department

Whose Voice the Waters Heard: A Short Story Cycle

In this collection of short stories, each short story is a unique exploration of the powerful and often enigmatic concept of loss. The common unity for the collection presents itself in two parts: place and theme. Characters of all ages, from all walks of life, go to the river to have their voices heard and to grieve a particular form of loss. The collection takes a dynamic and expansive view on loss, and each short story reflects a different idea or experience of loss. It seeks to examine not only what can be lost, but also what can and cannot be found. Some losses explored include: loss of life, control, memory, innocence and youth. While each story takes place around a different river and examines a different form of loss, the image of the river embodies the collection, as a river is both a thing in itself and a part of something much greater.

Lisa E. Stone

Major: Psychology

1:40 p.m., Room 222

Julie Walsh-Messinger, Ph.D., Thesis Advisor
Psychology Department

A Confirmatory Factor Analysis of Normative and Pathological Personality Traits in a University Student and Community Sample

Personality disorders are characterized by persistent maladaptive ways of thinking about and acting in the world. Historically, personality disorders have been conceptualized as qualitatively distinct clinical syndromes. Debate persists about whether it is more clinically useful to categorize personality disorders this way or to use a dimensional model that instead focuses on pathological levels of normative personality traits. The purpose of this study is to further explore the relationship between normative and pathological personality traits and to test a dimensional model with confirmatory factor analysis, using both a university student and a community sample. It is hypothesized that pathological personality traits, measured by the Personality Inventory for DSM-5, share the same underlying factor structure as normative traits, measured by the NEO Personality Inventory-3. Understanding the relationship between these two measures is important, as they are consistently used to diagnose and aid in treatment of individuals with personality disorders.

2:00 p.m.

Lauren A. Hoody

Major: Chemistry

2:00 p.m., Room 312

Mark Masthay, Ph.D., Thesis Advisor
Chemistry Department

The Impact of the 515nm Effect on Singlet Oxygen Quenching in Photosynthesis: Model System Studies Using β -Carotene–Acid Complexes

β -carotene (β C) is an orange biological pigment present in green plants, where it plays a protective role against the potentially harmful effects of light. β C does this by deactivating “singlet oxygen,” which is a toxic molecule generated during photosynthesis. During photosynthesis, β C temporarily converts from its native orange state to a pink state. I hypothesize that pink β C reacts with singlet oxygen less efficiently than native orange β C. To test this hypothesis, I chemically model β C's pink state with blue β C–acid complexes, which are chemically similar to pink β C, created by reacting β C with trifluoroacetic acid (TFA). β C's efficiency at deactivating singlet oxygen is characterized using a state-of-the-art NIRQuest spectrophotometer, which monitors the intensity of emission of infrared light by singlet oxygen. I anticipate that the singlet oxygen emissions will be more intense in the blue β C–acid complexes than native orange β C. This result would suggest that pink β C is less efficient than native orange β C at deactivating singlet oxygen. This research could facilitate the development of solar energy devices with greater long-term stability.

Kaleigh A. Jurcisek

Majors: Sociology and Criminal Justice Studies

2:00 p.m., Room 222

Jeanne A. Holcomb, Ph.D., Thesis Advisor
Sociology, Anthropology and
Social Work Department

Why Isn't There a Garden at School? Assessing Metro Parks' Green Schoolyards Program

School gardens have been shown to have positive effects on children's academic and personal lives. Five Rivers' Metro Parks has a program in place to encourage and assist schools within the Dayton region to implement school gardens and/or habitats. This research looks at the efficacy of the Green Schoolyards program through surveys and interviews with teachers and staff of 15 schools where the program has made at least one contact. This research will help inform the Five Rivers staff by identifying perceived benefits and constraints related to implementing school gardens and may facilitate the expansion of the Green Schoolyards program such that more students in the Dayton region are reached.

William J. Lawrence

Major: English

2:00 p.m., Room 331

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

Evidence and Uncertainty: A Critical Discourse Analysis of Scientific Language Regarding Climate Change and Doubt

My project is an examination of the way in which scientific reports are written by students. Specifically, I am focusing on how the information inscribed in lab notebooks early in the report-writing process is used as a resource in the final report product. My research will trace the development of a scientific report from the initial experiment and note-making to the final written product in order to determine how and when the notes are utilized.

Caroline A. Lynch

Major: Pre-medicine

2:00 p.m., Room 207

Tracy R. Butler, Ph.D., Thesis Advisor
Psychology Department

The Effects of Adolescent Housing Condition and Voluntary Exercise on Alcohol Intake and Stress Response in Male Long-Evans Rats

Can regular exercise during adolescence, combined with living in a social environment, lead to lower stress levels and alcohol intake later in life? The aim of this research is to combine the variables of adolescent housing conditions and voluntary exercise in the form of wheel-running to discover the impact on rats' subsequent responses to a stressor and alcohol intake/preferences. Since chronic stress has been discovered to be linked to the development of alcohol use disorders (AUDs) in humans, this study attempts to model this phenomenon in rats while incorporating a behavioral intervention with the intention of reducing the effects of chronic stress on anxiety-like behavior and alcohol intake/preference. Gaining an understanding of how housing conditions and exercise can play a role in subsequent alcohol intake and stress hormone levels will be beneficial to understanding the physiological effects of chronic stress, and may be useful for the advent of new pharmacotherapies for individuals with an alcohol-use disorder.

Kayla M. Pariser

Major: Mechanical Engineering

2:00 p.m., Room 211

Allison L. Kinney, Ph.D., Thesis Advisor
Mechanical and Aerospace Engineering Department

Influence of Reverse Shoulder Implant Positioning on Patient-specific Muscle Forces: A Simulation Study

A reverse total shoulder arthroplasty (RTSA) is a common treatment for patients with severe shoulder injuries, like rotator cuff tears, with the objective of stabilizing the shoulder and improving range of motion. The stability of the shoulder relies on the shoulder muscles. With rotator cuff tears, the RTSA enables the deltoid muscle to become the shoulder's primary stabilizer. The positioning of the implant affects the length of the deltoid muscle moment arm, which determines the amount of deltoid muscle force required to produce the necessary torque about the shoulder for it to function after a RTSA. The purpose of this study is to use simulation and optimization methods to optimize RTSA implant placement and deltoid muscle forces for fifteen RTSA patients. For each patient, a model of the shoulder joint and muscles and an optimization framework will be used to calibrate muscle model parameters and predict the shoulder muscle forces.

Nolan E. Sroczyński

Major: Economics

2:00 p.m., Room 310

Marlon Williams, Ph.D., Thesis Advisor
Economics and Finance Department

Taxation as a Consumption Behavior Modifier: An Experimental Economics Study

Consumers are presented with various prices depending on where we shop and what good we are purchasing. For example, buying clothing at a local store has a list price and then a sales tax is added at the register, whereas buying gas already has the tax applied to the sticker price. As organizations and governments attempt to reduce some consumption behaviors, there is reason to understand how various taxation can effect the buying behavior of the consumer. This research creates a behavioral economics study to analyze such effects in a laboratory setting, which will allow future research to use such methods instead of using natural settings such as a store.

2:20 p.m.

Ian N. Cali

Major: Leadership

2:20 p.m., Room 310

Paul Sweeney, Ph.D., Thesis Advisor
Management and Marketing Department

A Meta Analytic Review of the Antecedents and Consequences of Servant Leadership in Organizations

Servant leadership, a common yet complex concept, was first posited in the late 1970's. This term refers to a leadership style based on humility, authenticity and a heightened concern for employee empowerment and development. My review of the literature has uncovered over one hundred studies evaluating the effects of servant leadership, a literature that is best summarized by quantitative methods. Through Meta Analysis, a statistical procedure for combining multiple studies' data and determining the direction and magnitude of consistency study to study, my review examines the magnitude of effects in organizations. By carefully coding over one hundred studies, comprising nearly 20,000 subjects, I examined the effects of servant leadership on 32 different dependent variables such as work commitment, job satisfaction, turnover and job performance. In the process, I uncovered definite similarities not previously recognized. Such a broad and large collection of studies shows that servant leadership has sizable impacts on a variety of variables important to organizational effectiveness.

Luke S. Kozal

Majors: Mechanical Engineering
and German

2:20 p.m., Room 211

David H. Myszka, Ph.D., Thesis Advisor
Andrew P. Murray, Ph.D., Thesis Advisor
Paul Litke, MSME, P.E., Thesis Advisor
Mechanical and Aerospace Engineering Department

Design of an Opposed-piston, Opposed-stroke Diesel Engine for Utility Aircraft

An opposed-piston, opposed-stroke is a unique diesel engine design as each cylinder contains two pistons, which means that the combustion chamber is captured between the two pistons as they move towards each other. In this thesis project, an opposed-piston, opposed-stroke diesel engine was designed for use in utility aircraft. Utility aircraft are used for commercial purposes with a maximum takeoff weight of 12,500 lbs and commonly powered by gas turbine engines that drive a propeller. Compared to the turboprop alternative, opposed-piston diesel engines offer a greater power density, weight reduction and increases in fuel, thermal and combustion efficiencies. In conjunction with the Foundation for Applied Aviation Technology, specifications for the engine have been prepared, including a required 800 hp at takeoff. As part of the research project, an analytical simulation model was formulated to determine the appropriate physical dimensions and a virtual prototype was produced.

Elizabeth M. Turnwald

Majors: Music and Spanish

2:20 p.m., Room 207

Samuel N. Dorf, Ph.D., Thesis Advisor
Music Department

Catholicism, Gender and Politics in the Music and Performance of the Nueva Canción Song Movement

During the social and political turmoil of the 1960s and '70s, folk music rose to popularity throughout both North and South America. Singers such as Violet Parra of Chile, Mercedes Sosa of Argentina and Joan Baez of the United States were viewed as hopeful and resilient voices of the people. Although much has been done to examine the political impact of their work, my aim is to study their legacies through an interdisciplinary approach. By analyzing the music of these folkloristas through musical analysis, women/gender studies, performance studies and religious studies, I seek to connect the impact of their works with Catholic liturgical practice.

Lauren A. Van Atta

Majors: English and Psychology

2:20 p.m., Room 331

Rebecca Potter, Ph.D., Thesis Advisor
English Department

Ambiguous Pleasure(ers): Navigating the Bodies of Falstaff and Moll

In this work I discuss the ways in which the emerging capitalistic and patriarchal forces of Early Modern England affected the theater and social notions of consumption. Central to this discussion are related discussions of class, gender, sexuality and fertility. I examine the way in which these social forces interact and shape the reception and performance of one another, particularly as they concern the social interpretation of the fat body.

Emily E. Wey

Major: Biochemistry

2:20 p.m., Room 311

Thomas M. Williams, Ph.D., Thesis Advisor
Biology Department

Resolving the Molecular Mechanisms by Which DNA Mutations Alter the Function of a Cis-regulatory Element

Each human genome possesses around a million mutations that are genetic baggage from DNA replication mistakes or "mutations" that can either improve, reduce or have no effect on the health of an individual. Moreover, the effects of such mutations can depend on the presence or absence of other mutations, so-called epistatic interactions. Predicting the effects of mutations and epistatic interactions is difficult without knowing the function of the DNA sequence in which they reside. This challenge is heightened for cis-regulatory element sequences that act as switches to control gene transcription. My research uses fruit flies to test hypotheses about the molecular mechanisms by which mutations alter a genetic switch's activity and whether these mutations are subjected to the tyranny of epistatic interactions. The results will provide a sorely needed example where an understanding of molecular mechanisms bridges the gap between a DNA sequence and its in vivo function.

2:40 p.m.

Eric B. Borth

Major: Biology

2:40 p.m., Room 312

Ryan W. McEwan, Ph.D., Thesis Advisor
Biology Department

Seasonal Toxic Effects of Honeysuckle on a Model Organism

This experiment is focused on investigating the ecological problems caused by invasive species. Amur Honeysuckle is a non-native species that has invaded the shrub layer of many forests throughout the midwestern United States. Not much is known about the effects that this species may have on stream systems that rely on leaf input from the forest as a vital source of energy. Using an aquatic macroinvertebrate called *Hyalella azteca* as a model organism, we examined how the toxicity of Amur Honeysuckle leaves changed throughout the year. The results showed increased toxic effects during the spring and fall, with decreased toxicity in the summer.

Alexandra M. Hallagan

Major: Biology

2:40 p.m., Room 311

Thomas M. Williams, Ph.D., Thesis Advisor
Biology Department

CRISPR CREam for Fruit Flies: Developing a Genome-Editing Approach to Study the Cis-regulatory Elements that Control the Activities of Genes

Animal genomes possess over ten thousand genes and the number of cis-regulatory elements (CREs) controlling their utilization is perhaps ten times as numerous. Moreover, animal diversity has been prominently shaped by changes in these CREs. Thus, understanding the function of CREs and their evolutionary modification is necessary to grasp how animals develop and evolve. An ideal genetic approach to studying CREs is to remove and then replace them with a variant CRE to see how development changes. However, a feasible method does not exist to study the numerous CREs and their variant forms. My thesis sought to develop an approach to delete CREs from a fruit fly genome and subsequently replace them with variant forms by combining the CRISPR/Cas9 system with recombination-mediated cassette exchange. Success here should provide a powerful genetic capability for future research in various species and perhaps inspire ways to treat human genetic disorders.

Elizabeth A. Kelsch

Major: Exercise Physiology

2:40 p.m., Room 222

Anne Crecelius, Ph.D., Thesis Advisor
Health and Sport Science Department

The Impact of Acute Hypoxic Exposure on Vascular Function in Young, Healthy Humans

Cardiovascular health is a major topic of discussion in the world of medicine today. One of the main components of the cardiovascular system is our blood vessels. Understanding the health of our blood vessels is essential because vascular function is an important marker of overall risk for cardiovascular morbidity and mortality. One area of interest that I am looking into is the effect of hypoxia, or low oxygen exposure, on microvascular health. Since different diseases such as sleep apnea and chronic obstructive pulmonary disease can cause people to experience hypoxia, this is a relevant topic. To test microvascular health, we measured the reactive hyperemia, the return of blood flow to a specific tissue area after a brief periods of occlusion. We observed a difference in blood flow responses between normal conditions and hypoxic conditions and made a connection between hypoxia and vascular health.

Anna M. Marchiony

Majors: Criminal Justice Studies and
Psychology

You Have the Right to...What? A Study of Americans' Knowledge of Their Rights in Criminal Proceedings

What do Americans really know about the rights they hold as citizens? How confident are they in that knowledge? This project was designed to determine American citizens' knowledge of their legal rights and protections during criminal proceedings. A survey designed by the experimenters asked participants to indicate if statements about rights were true or false, and to indicate their confidence in their answers. Demographic questions included information about field of study, contact with the criminal justice system, and viewership of crime-based television shows to determine if these factors have an influence on accuracy and confidence in responses.

Tanner N. Rolfe

Major: Mechanical Engineering

Design and Prototyping of a Shape-changing Rigid-body Human Foot in Gait

This project focuses on the design and prototyping of a practical, multi-segment rigid body-foot mechanism capable of matching the dynamic change in profile of a human foot throughout multiple stages of gait. Dynamic models of the human foot often replicate the physiological change in shape of the foot during gait via compliant mechanisms. While rigid body-foot models exist, these models are often simplified as single-segment bodies incapable of accurately representing the geometry and kinematics of the human foot. Multi-segment rigid-body systems offer certain advantages over compliant systems which may be desirable in the design of ankle-foot devices, including the ability to withstand greater loading, the ability to achieve more drastic shape change and the ability to be synthesized from the kinematics, allowing for realistic functionality without consideration of the complex internal kinetics of the human foot.

Briar R. Smith

Major: Applied Mathematical Economics

Mothers as Career Leaders: Do Family Leave Laws Make a Difference?

This Honors thesis will explore the relationship between maternity leave and career advancement for women. In 2003, Lisa Belkin wrote about the "Opt-Out Revolution" in which highly-educated women, perhaps those in the best positions to break through the glass ceiling, began to drop out of the labor force to raise children. Under the Family and Medical Leave Act (FMLA) of 1993, certain qualifying individuals are permitted 12 weeks of unpaid, job-protected leave. On a national level, the FMLA is the only current law that gives new mothers a form of maternity leave, yet some states and private firms have implemented forms of paid family leave. This thesis seeks to understand if maternity leave length or type may worsen or better career prospects for women who choose to serve dual roles as caretakers and employees.

2:40 p.m., Room 207

Melissa Berry, Ph.D., Thesis Advisor
Psychology Department

2:40 p.m., Room 211

Andrew P. Murray, Ph.D., Thesis Advisor
David H. Myszka, Ph.D., Thesis Advisor
Mechanical and Aerospace Engineering Department

2:40 p.m., Room 310

Nancy Haskell, Ph.D., Thesis Advisor
Economics and Finance Department

3:00 p.m.**Jacob J. Clancy**

Major: Biology

Water Chemistry, Biotic Factors and Their Effects on the Populations of Zooplankton and Phytoplankton in Silver Lake in New Carlisle, Ohio, Compared to Selected Ohio Lakes and Reservoirs

There are many organisms other than fish that have a huge impact on the health of a body of water and everything that lives within it. These organisms are phytoplankton and zooplankton, small organisms that are at the bottom of the food web, that are very important in the energy transfer from the primary producers to secondary consumers. The measurement of zooplankton and phytoplankton species abundance is a good indicator of the health of the aquatic ecosystem (the body of water). My project will be focused on the relationship between water chemistry, nutrient availability and their effects on zooplankton and phytoplankton seasonally. Results from my study on Silver Lake will be compared with similar published studies on reservoir lakes in Ohio (Grand Lake St. Mary's and Lake Erie) that have seen toxic algae blooms and fish kills recently as a consequence of nutrient enrichment.

Raphael J. Crum

Major: Biology

Pravastatin™ Prevents Venous Shear Stress-Dependent Induction of Aquaporin 1 Protein Expression in Human Umbilical Vein Endothelial Cells in vitro

While the current procedure to address coronary artery obstruction involves the grafting of the human saphenous vein onto the heart (called a coronary artery bypass graft), a high percentage of vein grafts fail within five years. There is no definitive explanation for this failure; it is suggested that differences between venous and arterial shear stress might trigger this situation. What is known is that Aquaporin 1 (AQP1), a water channel expressed in the endothelial lining of blood vessels, is upregulated by changes in shear stress in human umbilical vein endothelial cells (HUVECs). This investigation aims to understand the regulation of AQP1 under venous shear stress and in the presence of the cholesterol-lowering drug Pravastatin™ in HUVECs. Results demonstrate that Pravastatin™ prevents the induction of AQP1 protein in HUVECs under shear stress conditions, suggesting that AQP1 might serve as a target for Pravastatin™ in improving long-term survival and success of vein grafts.

3:00 p.m., Room 311

Patrick K. Williams, Ph.D., Thesis Advisor
Biology Department

3:00 p.m., Room 310

Carissa M. Krane, Ph.D., Thesis Advisor
Biology Department

Elizabeth S. Miller

Major: Civil Engineering

3:00 p.m., Room 211

Elias Toubia, Ph.D., P.E., Thesis Advisor
Civil and Environmental Engineering Department

Evaluation of Protection of Fiber-Reinforced Polymer Wraps on Bridge Piers from Corrosive Effects of Snow and Ice Chemicals

In mid-western states, de-icing and anti-icing chemicals are commonly used on highways in order to prevent the accumulation of snow, ice or frost. Highway bridge components, such as decks or piers, contain steel reinforcing that is heavily exposed to these chemicals. Because of exposure, corrosion may develop in the steel reinforcing, potentially causing long-term structural damage and deficiencies within the bridge. In order to prevent corrosion in bridge components, specifically piers, external improvements such as protective paints, wraps or hard shells can be utilized. This thesis specifically focuses on the use of both Glass Fiber Reinforced Polymer Wraps and Carbon Fiber Reinforced Polymer Wraps, and their ability to serve as an external protection method to reinforced concrete against corrosive de-icing and anti-icing chemicals. Tests simulating freeze/thaw cycles during exposure to chlorine-heavy chemicals were completed in order to determine the effectiveness of the wraps used.

Mitchell W. Pollard

Major: Sport Management

3:00 p.m., Room 222

Corinne Daprano, Ph.D., Thesis Advisor
Health and Sport Science Department

Amateurism and the NCAA: The Controversy (a Legal Review)

There is rising concern that the concept of “amateurism” is limiting to student-athletes who are governed by the NCAA. Amateurism is a complex subject, and is becoming more so with recent litigation (e.g. O’Bannon v. NCAA, Bloom v. NCAA) and events. This research is a review of what both sides, the NCAA and student-athletes, have argued “amateurism” means and the effect this conflict has on intellectual property law.

Charlotte A. Shade

Major: Biology

3:00 p.m., Room 312

Ryan W. McEwan, Ph.D., Thesis Advisor
Biology Department

Amur Honeysuckle (Lonicera maackii) Invasion Drives Alterations in Nutrient Dynamics in Forests and Headwater Streams

Lonicera maackii (Amur honeysuckle) invasion is extensive in forests across much of Ohio and the Midwest. The invasion of *L. maackii* has been shown to influence headwater streams and its organisms, which depend on a certain water chemistry to survive. Little has been done to understand how honeysuckle affects water chemistry and nutrient cycling. As *L. maackii* canopies prevent native organic matter from entering the streams below, while also adding its own organic matter that is high in nitrogen and low in lignin, the amount and types of nutrients present in both forests and streams may be significantly altered. Over a one-year time period, five riparian stream sites were sampled and analyzed for a variety of chemical parameters. It was found that *L. maackii* does have an effect on some of these chemical variables, but does not necessarily follow a gradient of honeysuckle, as predicted.

Victoria S. Szczechowski

Major: Political Science

3:00 p.m., Room 207

Nancy Miller, Ph.D., Thesis Advisor
Political Science Department

Policy Implications: An Analysis of International Adoption in Relation to Nationalist Sentiment

Policy Implications: An Analysis of International Adoption in Relation to Nationalist Sentiment explores the possibility of a relationship between the restrictiveness of the international adoption policy of multiple countries and the nationalism expressed by each country's citizens and government.

3:20 p.m.

Maggie L. Inman

Major: Psychology

3:20 p.m., Room 207

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

Behind the Stigma: An Examination of the Impact of Gender and College Adjustment on Attitudes towards Mental Illness

Society has shamed people with mental illness for their struggles, whether the shaming is blatant or subtle. There has been much research examining this shame and stigma of mental illness, typically focusing on how attitudes and perceptions of people with mental illness are influenced by demographic variables, like race, age and gender. However, past studies have only examined gender through simply asking participants if they are male or female. In-depth examinations of gender have only looked at adherence to traditional gender roles, while ignoring possible nontraditional roles. Past research has also not focused on social variables, like college adjustment. Since many studies use undergraduate students as participants, it is reasonable to assume that a student's adjustment to college could influence their attitudes toward mental illness. This study examines how gender, in the form of masculine and feminine traits, and college adjustment influence attitudes towards mental illness.

Marissa C. Jama

Major: Biology

3:20 p.m., Room 312

Jayne B. Robinson, Ph.D., Thesis Advisor
Biology Department

Effectiveness of Antimicrobial Dark Therapy Utilizing Porphyrins against Infections Caused by the Model Organism Mycobacterium smegmatis

Antimicrobial photodynamic therapy (PDT) utilizing porphyrins has emerged as a possible treatment against antibiotic-resistant bacteria. Porphyrins, such a novel porphyrin containing the element zinc which has designated ZnP, kill bacterial cells when exposed to light by a mechanism that is not yet fully understood. Previous experiments have shown ZnP to be able to kill bacteria in the dark which is unique to few porphyrins. The aim of this research is to understand the effect ZnP has on *Mycobacterium smegmatis*, a model organism for the pathogenic bacterium *Mycobacterium tuberculosis* which causes the lung infection tuberculosis. Further experimentation includes understanding the effects of ZnP on *M. smegmatis* biofilm formation and disruption as well as antibiotic uptake in formerly antibiotic-resistant cells.

Claudia J. Labrador Rached

Major: Chemical Engineering

3:20 p.m., Room 211

Kristen K. Comfort, Ph.D., Thesis Advisor
Chemical and Materials Engineering Department

The Ability of Platinum Nanoparticles to Induce Stress Responses, Immune Activation and Signal Transduction Modification in HepG2 Liver Cells

Platinum nanoparticles (PtNPs) have potential therapeutic uses since they have been found to diminish the cell stress response associated with multiple diseases, including immune diseases and cancer. This project aims to uncover the ability of PtNPs to induce stress,

immune activation, and signal transduction responses within human liver cells in order to develop their use in therapeutic methods. Following acute exposure to a high dosage of PtNPs, a minor stress response occurred in the absence of any cytotoxicity while negligible stress was seen under low concentrations. Inflammatory responses were analyzed from the presence of cytokines, chemical substances produced by the immunological system. The effects of PtNPs in signaling pathways were evaluated as signal transduction controls of cellular functionality. PtNPs induce inflammatory and signaling responses in liver cells, and these observed behaviors are dependent upon delivered PtNP dosage.

Elizabeth L. Pedrotti

Major: English

3:20 p.m., Room 331

Jennifer E. Haan, Ph.D., Thesis Advisor
English Department

Aiscrima e Checchi: Italian-American Dialect and Development in the New Millennium

My project explores the language usage and perceptions of Italian-Americans in the Dayton area. I focus particularly on their use of words or phrases considered part of an Italian-American variety of English and the roles the Italian language plays in family and community life. I situate my research in current and past scholarship, looking toward Hermann Haller's 1981 study of Italian-American language patterns and the Italian-American word list compiled by A. Menarini in 1947. By combining personal interviews with Italian Americans living in the Dayton area today with more widespread conceptions of Italian American language and culture, I present an in-depth study within a niche of a larger community.

Christopher J. Turley

Major: Biology

3:20 p.m., Room 310

Carissa M. Krane, Ph.D., Thesis Advisor
Biology Department

Dead or Alive? The Story of a Frog's Survival

When unprotected cells freeze, ice crystals form and destroy the cellular membrane. Once destroyed, the cells no longer have anything holding the interior together, which causes immediate cellular death. So, evolutionarily different organisms have developed methods to survive freezing temperatures. This project focuses on understanding the mechanism of freeze tolerance utilized by Cope's Gray Treefrog (*Hyla chrysoscelis*). Freeze tolerance is the use of cryoprotectants to control the process of cellular freezing. *H. chrysoscelis* utilizes glycerol as a cryoprotectant, and protein channels facilitate the passive movement of glycerol across the cellular membrane. My project focuses on analyzing the effects of epinephrine, a neurohormone, on the expression of protein channels and their insertion into the cellular membrane. Upon completion, these findings will potentially be applied to the improvement of cryopreservation of transplant organs.

3:40 p.m.

Jonathan Alessi

Major: Biochemistry

3:40 p.m., Room 310

Vladimir A. Benin, Ph.D., Thesis Advisor
Chemistry Department

**Preparation, Analysis and Derivatization of Benzo[1,2-d:3,4-d':5,6-d'']
tris(thiazole)-2,5,8-triamine**

Multiple fields are areas of active research where organic materials hold considerable promise, such as thermoelectrics or photovoltaics. In an effort to design and prepare a new system which would exhibit a set of promising features such as high thermal stability, high degree of planarity, rigid skeleton and strong electron accepting properties, we have undertaken the preparation and characterization of benzotrithiazole and its derivatives. Our work has led to a reproducible and scalable protocol for the generation of one particular structure: benzo[1,2-d:3,4-d':5,6-d'']tris(thiazole)-2,5,8-triamine. We have also conducted further attempts to functionalize this structure, leading to other derivatives of the target compound.

Sarah M. Byrne

Major: Biology

3:40 p.m., Room 312

Amit Singh, Ph.D., Thesis Advisor
Biology Department

**Effects of Ultrasound on Amyloid Beta 42 (A β 42) Mediated
Neurodegeneration**

Alzheimer's Disease (AD) is a progressive neurodegenerative disease associated with accumulation of amyloid-beta 42 (A β 42) plaques, generated by improper cleavage of amyloid-precursor-protein (APP) generating hydrophobic A β 42 polypeptide. These aggregate to form plaques and thereby trigger neurodegeneration. The model organism, *Drosophila melanogaster*, has a similar genetic makeup to humans serving as an excellent model for human diseases including AD. We have developed an AD model with transgenic flies that mis-expresses high levels of human A β 42 in developing retina of the fly, exhibiting highly reduced eye due to progressive neurodegeneration in the retina. Ultrasound waves have been extensively used in medicine for treating inflammations related to sport injuries as well as dislodging aggregates. Our hypothesis is that ultrasound waves can dissociate the aggregated plaques, which may prevent neurodegeneration. This hypothesis was tested by exposing flies to a series of ultrasound treatments including changing variables in type and time of exposure and assay its effect on the amyloid plaques, the adult eye phenotype, as well as survival rates.

Kelsey A. Clayback

Major: Psychology

3:40 p.m., Room 207

Mary Fuhs, Ph.D., Thesis Advisor
Psychology Department

**Executive Functioning Skills in Preschoolers with High-Functioning Autism
Spectrum Disorder Compared to Typically Developing Peers**

This study examined executive functioning skills (EF) of children ages 3 to 6 with high-functioning autism spectrum disorder (HFASD) compared to a control group of typically developing peers. Previous research has inconsistently noted EF deficits in children with HFASD compared to children with typical development. This research sought to further examine EF in children with HFASD. Individual assessments were used to measure cognitive flexibility, inhibitory control and working memory in each group. Results indicated deficits in cognitive flexibility/attentional shift in the HFASD group when controlling for age, gender and language. Differences in inhibitory control and working memory were not significant. This research has implications for the future direction of research on HFASD. Specifically, future research should further consider the nature of deficits in EF in order to better understand EF development in HFASD. Additionally, these research findings have implications for treatment and target skills for children with HFASD.

Paige C. Flannely

Majors: Accounting and English

3:40 p.m., Room 311

Jennifer E. Haan, Ph.D., Thesis Advisor
English Department

Young Adult Fiction: Inside the Mirror Image

The pure definition of self-image is the opinion one has of oneself. This understanding of oneself is influenced by a multitude of external forces, specifically, interactions with peers, family members, societal standards, grief, and illness. My research focuses on five novels: *13 Reasons Why*, *The Boyfriend List*, *The Fault in Our Stars*, *Lock and Key* and *All the Bright Places*. These novels provide concrete examples of how a teen's image of self is impacted by certain interactions. Each novel follows a teenage girl through the most ordinary, extraordinary or life-altering instances in a teen's life. The interactions each teen confronts in these moments provides the backbone of my research. Through the study of Young Adult literature's different portrayals of self, I convey the current trends in themes of self-image and how no one size fits all.

Tyler M. Masthay

Majors: Computer Science and Mathematics

3:40 p.m., Room 331Paul W. Eloe, Ph.D., Thesis Advisor
Mathematics Department***Extending Second- and Third-order Uniqueness Implies Existence Results to Fractional Differential Equations***

You are given two dots and are asked to connect these dots with a straight line. This is an easy task to complete, so we say that a solution to this problem exists. We say that this solution is unique given that any straight line that passes through both points must be the exact same line. However, if we relax the problem to allow for any shape possible, then there is clearly more than one way to do this, so the solution exists but is not unique. Precisely, a solution to a problem exists if there is at least one solution and is unique if there is at most one solution. Results have been shown for boundary-value problems for ordinary differential equations whereby assumption of the uniqueness of solutions to boundary value problems implies their existence. We present extensions of these results to fractional differential equations.

Robert F. Uhrig

Major: Chemical Engineering

3:40 p.m., Room 211Kristen Comfort, Ph.D., Thesis Advisor
Chemical and Materials Engineering Department***The Impact of a Dynamic Environment on Deposition and Cellular Response to Silver Nanoparticles***

Silver nanoparticles (AgNPs) are utilized in many different applications, such as an antibacterial agents or as protective coating against ultraviolet light. However, these AgNPs are known to cause potentially harmful biological effects, including toxicity, induction of stress and immune activation. In this study, the effects of AgNPs on a human lung cell model were examined within both a static and dynamic environment. Most NP-based research is carried out in static environments, but do not accurately reflect dynamic physiological conditions. Dynamic fluid movement was introduced to the cell culture through the use of a multi-channel peristaltic pump. To further characterize the influence of fluid movement, two different-sized AgNPs were tested, 5 nm and 50 nm. The AgNPs were then introduced to the lung cells, under either static or dynamic conditions for a duration of 24 hours. Following this exposure, the cells underwent evaluation for NP deposition, cell viability, cell stress and inflammatory responses. The results indicated that biological responses were dependent on the delivered NP dosage, which was substantially diminished in a dynamic environment.

4:00 p.m.**Erich N. Auer**

Majors: Biochemistry and Chemistry

4:00 p.m., Room 311Matthew Lopper, Ph.D., Thesis Advisor
Chemistry Department***The Effects of Structural Modification of the Wing Helix Domain of PriA on Bacterial DNA***

During a cell's life it must copy itself or face death. For the cell to form a new copy it must replicate its DNA; this DNA is the blueprint for the essential components of the cell. The replication process does not always go to completion, which is necessary for the cell to survive, so there are mechanisms to keep the replication process running smoothly. In bacteria, PriA is used to restart replication after damage to the DNA. By looking at the structure of PriA we can start to determine how exactly it works with the damaged DNA to fix it and restart the replication process. Specifically looking at the portion of PriA that attaches to DNA, we are attempting to determine why this method of attachment is beneficial to the entire replication process. This is done by modifying the structure of PriA and observing the changes in DNA repair.

Michael A. Coladipietro

Major: Chemistry

4:00 p.m., Room 310Shawn Swavey, Ph.D., Thesis Advisor
Chemistry Department***Two-step Synthetic Route toward Asymmetric and Symmetric Boron Dipyrrromethenes: Synthesis, Optical Properties and Electrochemistry***

A more efficient, economically feasible route toward synthesis of Boron Dipyrrromethenes (BODIPY) Dyes is detailed. The chemistry behind the effectiveness of these BODIPY compounds as dye sensitizers for dye-sensitized solar cells (DSSCs) is explained. The synthetic process, characterization of compounds and description of electrochemical properties that make these dyes better sensitizers for DSSCs is highlighted.

Christian R. Jensen

Major: Biology

4:00 p.m., Room 331Mark Nielsen, Ph.D., Thesis Advisor
Biology Department***Analysis of the Spermtail Axoneme Following a Substitution of Drosophila melanogaster Beta 2-Tubulin with Anopheles gambiae Beta 2-Tubulin: Functional or Not?***

The current diversity of the Earth has arisen through mutation and competition in an ever-changing world. The features of an organism are not equally amenable to mutation; there are aspects of life that have remained unchanged for millions of years. This is the case for the beta-2 tubulin coding sequence in *Drosophila melanogaster*, or the common fruit fly. Beta-2 is responsible for the formation of a functional sperm-tail; males are infertile without a functional sperm-tail. This protein has not evolved as a single amino acid for at least 110 million years. The mosquito *Anopheles gambiae* shared an ancestor with fruit flies 220 million years ago and has 40 changes in its beta-2 sequence. My aim is to discover what changed between mosquitoes and fruit flies that allowed beta-2-tubulin to undergo

these rare changes. To study this it is necessary to create a transgenic organism; to replace the *D. melanogaster* beta-2 tubulin sequence with the *Anopheles* beta-2-tubulin sequence. If *Anopheles* beta-2 tubulin can support a *Drosophila* spermtail, we can conclude that the changes are neutral and beta-2 walked a “narrow path” of evolution that maintained beta-2 function throughout these changes. If it cannot, we can conclude that the spermtail itself must have changed, in a manner that required a different beta-2 sequence. Such a change represents a significant evolutionary event since the organisms’ initial divergence, and likely underlies a “slow-step” in evolution that prohibits certain features from typically participating in the adaptive process.

Jason N. Kleppel

Major: Pre-medicine

4:00 p.m., Room 312

Amit Singh, Ph.D., Thesis Advisor
Biology Department

Role of Dpp-Signaling Pathway in Promoting Survival of Retinal Neurons in A β 42-mediated Neurodegeneration

Alzheimer's disease is a progressive neurodegenerative disorder with no known cure to date. One cause of Alzheimer's neuropathy is the generation of Amyloid-beta-42 (A β 42) aggregates that trigger cell death by unknown mechanisms. Using a transgenic *Drosophila* eye model misexpressing human A β 42, we observed the AD-like neuropathy. In a forward genetic screen we have identified Decapentaplegic (Dpp), a morphogen, as one of the genetic modifiers of A β 42-mediated neurodegeneration. Dpp acts as the ligand for the dpp pathway, which exhibits suppression of retinal neuron's cell death. The Dpp signaling pathway involves several key components. We examined the Dpp-signaling pathway and its members in modifying A β 42-mediated neuropathy. The results from our studies will be presented.

Alicia A. Linzmeier

Majors: Criminal Justice Studies and
Political Science

4:00 p.m., Room 222

Arthur J. Jipson, Ph.D., Thesis Advisor
Sociology, Anthropology and
Social Work Department

The Promise of Justice: Are Public and Private Defense Equal?

This thesis will attempt to uncover whether or not public defense lawyers and private defense lawyers achieve the same or similar results for their clients facing serious felony charges in southwestern Ohio. The outcomes of interest are conviction rates, guilty plea rates, incarceration rates and sentence lengths. Though people facing equally serious charges should receive roughly equal outcomes, this is not always the case. Existing literature suggests that some of the differences could be dependent on the type of lawyer that a defendant has, or whether or not he or she can afford to pay for his or her own representation. Future research will examine if these differences manifest themselves in six counties in southwestern Ohio by studying unclassified and first degree felony cases that have been filed since January 1, 2000.

George E. Padavick

Major: Mechanical Engineering

4:00 p.m., Room 211

Binod Kumar, Ph.D., Thesis Advisor
Hanley Sustainability Institute/Human Rights Center

An Investigation of Supercapacitor Design with Specific Emphasis on Energy Density

Imagine charging your phone in minutes rather than hours. With supercapacitor technology this could become a reality. Supercapacitors offer an alternative to batteries in that they store electrical energy but provide faster charging and discharging. However, commercial supercapacitors store less energy than batteries, resulting in the widespread prevalence of batteries over supercapacitors. Recent developments in advanced carbon materials have improved the energy density of supercapacitors, suggesting that further improvements can be made. This work aims to build on materials development to provide better energy storage systems specifically by increasing the energy density of supercapacitors. Applications include electric vehicles, smart grid technology, renewable energy and your smartphone.

Kiersten S. Remster

Major: Art History

4:00 p.m., Room 207

Roger J. Crum, Ph.D., Thesis Advisor
Art and Design Department

Challenging the Postwar Narrative: The Outsider Art of Boris Lurie

Boris Lurie, a Holocaust survivor and an immigrant to the U.S. in the 1950s, created pointedly provocative art recollective of his traumatic experiences in Europe during World War II. While Lurie was not alone in creating memory-driven art from his experiences, art historians have not included him in the standard postwar narrative of progressive art. Instead, he has been relegated to the position of an outsider artist. Comparing Lurie's art to that of other, more recognized émigré artists who produced work in recollection of war-torn Europe, such as Max Beckmann and George Grosz, this thesis aims to expose a broader recollective vein in postwar art in America that at once draws Lurie more into the mainstream and shows his life and work as important antecedents to the art made decades later by another cohort of German artists whose themes of recollection of wartime trauma were at the center of their celebrated and progressive art.

4:20 p.m.

Meggan A. Bridgett

Majors: Biology and Chemistry

4:20 p.m., Room 311

Matthew Lopper, Ph.D., Thesis Advisor
Chemistry Department

***Determining the Structure of the Deinococcus radiodurans
Nucleoid-associated Protein DR0199 by X-ray Crystallography***

Proteins that bind DNA are important for maintaining and organizing bacterial DNA. This project examines the structure of a DNA-binding protein found in *Deinococcus radiodurans*, protein DR0199. To determine the structure, the protein was isolated and crystallized then examined by x-ray crystallography. Further examination was conducted to look at the interactions between the DR0199 protein and other proteins found in *Deinococcus radiodurans*.

Alexander J. Farmer

Major: Biochemistry

4:20 p.m., Room 331

Judit K. Beagle, Thesis Advisor
Chemistry Department

***Synthesis of Bis(quinoxalino) Ligand for the Removal
of Transition Metal Contamination***

In an increasingly “green” world, transition metal contamination has become a growing concern. Transition metals can be found both in the natural environment and can be produced as the result of human activity. They are widely used as industrial catalysts and can persist in reaction mixtures and potentially in final products. Transition metals pose a major threat to natural ecosystems and human health. Therefore, their contamination is of great concern. The objective of our research program is to find ways to efficiently detect and selectively remove transition metal contamination from both reaction mixtures and soil and water samples. The objective of our research within the scope of this project can be broken down into two parts: (1) the design and synthesis of molecules that can interact with transition metals, and (2) to test the interactions between the molecules synthesized in part 1 and transition metals to determine sensibility and selectivity.

Matthew R. Riccetti

Major: Biology

4:20 p.m., Room 312

Amit Singh, Ph.D., Thesis Advisor
Biology Department

***Ecdysone (Ecd) Signaling Pathway Activation Can Block
A β 42-mediated Neurodegeneration***

Alzheimer's disease (AD) is a chronic neurodegenerative condition characterized by the accumulation of improperly folded Amyloid-Beta-42 (A β 42) protein plaques. These proteins surround nerve cells and lead, progressively, to their death. We misexpressed human A β 42 in the eye of *Drosophila* using a GMR-Gal4 driver (a transgenic approach), inducing A β 42-mediated cell death in nearly all photoreceptor neurons. This models the human condition, as the involved cellular communication is nearly identical in flies and humans. In a forward genetic screen, we identified the Ecdysone (Ecd)-signaling pathway as a modifier of A β 42-mediated neurodegeneration. We showed that overexpression of Taiman, the Ecd

transcription factor, rescues the AD phenotype by inducing expression of proteins that inhibit programmed cell death. Taiman therefore acts in a neuroprotective way by reducing the death of neurons, and is a possible target for AD therapeutics in the future.

Virginia A. Saurine

Major: Secondary Catholic Religious Education

4:20 p.m., Room 211

Susan Ferguson, M.S., Thesis Advisor
Center for Catholic Education /
Teacher Education Department

***Educating the Whole Child: Using Positive Adult Relationships
to Develop Noncognitive Skills in Students Facing Adversity***

All children, specifically under-resourced children, often experience multiple stressors in their everyday lives that can negatively impact their performance in school. However, numerous research studies have shown that the most significant protective factor for children experiencing this toxic stress is a caring, adult relationship. Additionally, this study focuses on how these positive child-adult relationships are able to develop certain noncognitive skills, specifically grit and growth mindset, in order to push students to understand their abilities and reach their academic goals. Building the teacher-student relationship aids children in developing these academic, social and emotional skills necessary to be successful in the classroom.

Norbert D. Wessels

Major: Sociology

4:20 p.m., Room 222

Arthur J. Jipson, Ph.D., Thesis Advisor
Sociology, Anthropology and Social Work Department

The Possible Communal Biases in Alibi Evaluation

With the changing landscape of the criminal justice system, it is important to understand the biases that are inherent in our decision making. Awareness of these biases can mean the difference between incarceration and freedom for wrongfully accused persons. The alibi is an essential piece of defense intended to disassociate the accused from a crime. Adding to previous research, my goal is to examine the biases inherent with the evaluation process of an alibi. Specifically, it examines the existence of bias associated with geographic community and the identification with said community.

4:40 p.m.

Lucy E. Bratton

Major: Graphic Design

4:40 p.m., Room 331

Jayne Matlack Whitaker, M.F.A., Thesis Advisor
Art and Design Department

Understanding Place Branding

Place branding is an emerging area of design encompassing region branding and city branding. It markets the physical, economic, social and civic qualities of a place to enhance economic and community development. Successful city brands are derived from the histories, qualities, lifestyles and cultures of their cities to proactively form beneficial partnerships between city municipalities and government. This process is particularly complex because of the diversity of stakeholders involved. By closely examining successful samples of recent place branding, I will create guidelines and apply my findings to a newly-proposed branding of the city of Dayton.

Matthew B. Mackowiak

Majors: International Studies and
German

4:40 p.m., Room 222

Jaro Bilocerkowycz, Ph.D., Thesis Advisor
Political Science Department

Race for the Arctic: National Security Interests in the Far North

With the steady melting of Arctic ice, the door has opened to northern shipping routes and access to Arctic oil reserves. As a result, the Russian Federation has jumped at the chance to control as much of the Far North as possible, aggressively militarizing Cold War era bases and staking claims of vast maritime territory. With all of these recent developments, the political climate at the top of the world is changing dramatically. How is Russia flexing its muscles to control Arctic natural resources and what does this mean for the national security interests of the United States? This study will examine the institutions for Arctic governance and recent Russian activities — political and military — in the Arctic region. It will show how Russia's aggressive actions in, and militarization of, the Arctic region poses a threat to the United States' national security interests. I will provide examples of Russian military exercises conducted in the region as well as quantitative data tables showing Arctic resource reserves. The analysis will explain why Russia's policy in the Arctic is aggressive and what the implications are for the United States and other Arctic states.

Margaret E. Wagner

Major: Middle Childhood Education

4:40 p.m., Room 211

Molly A. Schaller, Ph.D., Thesis Advisor
College Student Personnel and
Higher Education Administration
Connie R. Mathes, M.Ed., Thesis Advisor
Teacher Education Department

The Legal Perceptions of Educators in Response to an Opioid Overdose and the Implication for Educator Emergency Medical Intervention

This study is focused within the State of Ohio. The goal is to increase the understanding of the current level of concern of opioid drug usage and abuse within school districts and to understand school leaders' willingness to provide training of school staff to administer naloxone in drug-induced overdoses on school property. The research explores variables of school district demographic classifications, as well as education- and drug-related experience of school leaders. With other states such as Massachusetts and West Virginia serving as models of naloxone training into their school districts, it is imperative to start the research of perceptions of school leaders in implementing training programs for Ohio school districts.

Evan J. Wypasek

Major: Biology

4:40 p.m., Room 312

Amit Singh, Ph.D., Thesis Advisor
Biology Department

Role of Motif 1 Binding Protein (M1BP) in Eye Development

In all multicellular organisms, cascades of genes are involved in fundamental process of organogenesis because the genetic machinery is highly conserved between flies and humans. The fruit fly, *Drosophila melanogaster*, is the quintessential organism to study the role of patterning genes. We have identified the new role of highly-conserved Motif 1 binding protein in eye development. M1BP contains five C2H2 zinc-fingers domains, which are what allow the protein to bind specific DNA and thereby regulate gene expression during *Drosophila* eye development. M1BP resides on chromosome 2 of the *Drosophila melanogaster*. In my study, absence of M1BP function using transgenic flies results in reduction of eye size. We also found a few exciting phenotypes which suggests this protein has also been associated with the adult head fate of the fly. This knowledge can be applied to human eye development to better understand birth defects in the human eye.

advisors

ADVISOR	DEPARTMENT	ADVISOR	DEPARTMENT
Beagle, Judit K., Ph.D.	Chemistry	Masthay, Mark, Ph.D.	Chemistry
Benin, Vladimir A., Ph.D.	Chemistry	Mathes, Connie R., M.Ed.	Teacher Education
Berry, Melissa, Ph.D.	Psychology	Matlack Whitaker, Jayne, M.F.A.	Art and Design
Bigelow, Kimberly, Ph.D.	Mechanical and Aerospace Engineering	McEwan, Ryan, Ph.D.	Biology
Bilocerkowycz, Jaro, Ph.D.	Political Science	Miller, Nancy, Ph.D.	Political Science
Butler, Tracy R., Ph.D.	Psychology	Murray, Andrew P., Ph.D.	Mechanical and Aerospace Engineering
Comfort, Kristen K., Ph.D.	Chemical and Materials Engineering	Myszka, David H., Ph.D.	Mechanical and Aerospace Engineering
Crecelius, Anne, Ph.D.	Health and Sport Science	Nielsen, Mark, Ph.D.	Biology
Crum, Roger J., Ph.D.	Art and Design	O'Mara, Erin, Ph.D.	Psychology
Daprano, Corinne, Ph.D.	Health and Sport Science	Pici, Joseph, M.A.	English
Dorf, Samuel N., Ph.D.	Music	Potter, Rebecca, Ph.D.	English
Eloe, Paul W., Ph.D.	Mathematics	Robinson, Jayne B., Ph.D.	Biology
Ferguson, Susan, M.S.	Center for Catholic Education, Teacher Education	Rodriguez, Dario, Ph.D.	Psychology
Fuhs, Mary, Ph.D.	Psychology	Ruggiero, John, Ph.D.	Economics and Finance
Haan, Jennifer E., Ph.D.	English	Schaller, Molly A., Ph.D.	College Student Personnel and Higher Education Administration
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Heyne, Joshua, Ph.D.	Mechanical and Aerospace Engineering	Shimmin, Donald, M.A.	Economics and Finance
Holcomb, Jeanne A., Ph.D.	Sociology, Anthropology and Social Work	Singh, Amit, Ph.D.	Biology
Jipson, Arthur J., Ph.D.	Sociology, Anthropology and Social Work	Sun, Yvonne, Ph.D.	Biology
Keune, Marsha, Ph.D., CPA	Accounting	Swavey, Shawn, Ph.D.	Chemistry
Kinney, Allison L., Ph.D.	Mechanical and Aerospace Engineering	Sweeney, Paul, Ph.D.	Management and Marketing
Krane, Carissa M., Ph.D.	Biology	Thomas, Patrick W., Ph.D.	English
Kumar, Binod, Ph.D.	Hanley Sustainability Institute / Human Rights Center	Toubia, Elias, Ph.D., P.E.	Civil and Environmental Engineering
Layman Guadalupe, Melissa, Ph.D.	Psychology	Walsh-Messinger, Julie, Ph.D.	Psychology
Litke, Paul, MSME, P.E.	Mechanical and Aerospace Engineering	Williams, Marlon, Ph.D.	Economics and Finance
Lopper, Matthew, Ph.D.	Chemistry	Williams, Patrick K., Ph.D.	Biology
		Williams, Thomas M., Ph.D.	Biology

presenters

PRESENTER	SESSION TIME AND ROOM	PRESENTER	SESSION TIME AND ROOM
Abrams, Elizabeth A.	1:00 pm, Room 310	Mackowiak, Matthew B.	4:40 pm, Room 222
Alessi, Jonathan	3:40 pm, Room 310	Malick, Samantha A.	1:00 pm, Room 207
Auer, Erich N.	4:00 pm, Room 311	Marchiony, Anna M.	2:40 pm, Room 207
Borth, Eric B.	2:40 pm, Room 312	Masthay, Tyler M.	3:40 pm, Room 331
Bratton, Lucy E.	4:40 pm, Room 331	McDaniel, M. Colleen	1:20 pm, Room 222
Bridgett, Meggan A.	4:20 pm, Room 311	McFadden, Stephen T.	1:00 pm, Room 211
Byrne, Sarah M.	3:40 pm, Room 312	Miller, Elizabeth S.	3:00 pm, Room 211
Cali, Ian N.	2:20 pm, Room 310	Padavick, George E.	4:00 pm, Room 211
Carey, Douglas S.	1:40 pm, Room 312	Pariser, Kayla M.	2:00 pm, Room 211
Clancy, Jacob J.	3:00 pm, Room 311	Payton, Lydia C.	1:20 pm, Room 310
Clayback, Kelsey A.	3:40 pm, Room 207	Pedrotti, Elizabeth L.	3:20 pm, Room 331
Coladipietro, Michael A.	4:00 pm, Room 310	Peiffer, Erin E.	1:20 pm, Room 211
Crum, Raphael J.	3:00 pm, Room 310	Pollard, Mitchell W.	3:00 pm, Room 222
Farmer, Alexander J.	4:20 pm, Room 331	Remster, Kiersten S.	4:00 pm, Room 207
Flannelly, Paige C.	3:40 pm, Room 311	Riccetti, Matthew R.	4:20 pm, Room 312
Golterman, Kathleen D.	1:20 pm, Room 207	Rolfe, Tanner N.	2:40 pm, Room 211
Hagan, Grace E.	1:40 pm, Room 331	Saurine, Virginia A.	4:20 pm, Room 211
Hallagan, Alexandra M.	2:40 pm, Room 311	Shade, Charlotte A.	3:00 pm, Room 312
Hoody, Lauren A.	2:00 pm, Room 312	Smith, Briar R.	2:40 pm, Room 310
Hunton, Natalie M.	1:00 pm, Room 312	Sroczyński, Nolan E.	2:00 pm, Room 310
Inman, Maggie L.	3:20 pm, Room 207	Stone, Lisa E.	1:40 pm, Room 222
Jama, Marissa C.	3:20 pm, Room 312	Szczechowski, Victoria S.	3:00 pm, Room 207
Jensen, Christian R.	4:00 pm, Room 331	Turley, Christopher J.	3:20 pm, Room 310
Jurcisek, Kaleigh A.	2:00 pm, Room 222	Turnwald, Elizabeth M.	2:20 pm, Room 207
Kelsch, Elizabeth A.	2:40 pm, Room 222	Uhrig, Robert F.	3:40 pm, Room 211
Kleppel, Jason N.	4:00 pm, Room 312	Van Atta, Lauren A.	2:20 pm, Room 331
Kozal, Luke S.	2:20 pm, Room 211	Wagner, Margaret E.	4:40 pm, Room 211
Labrador Rached, Claudia J.	3:20 pm, Room 211	Wargo, Kevin M.	1:20 pm, Room 312
Lawrence, William J.	2:00 pm, Room 331	Wessels, Norbert D.	4:20 pm, Room 222
Linzmeier, Alicia A.	4:00 pm, Room 222	Wey, Emily E.	2:20 pm, Room 311
Lynch, Caroline A.	2:00 pm, Room 207	Wypasek, Evan J.	4:40 pm, Room 312



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