



COLLEGE OF
ARTS & SCIENCES

ASHLAND UNIVERSITY

Undergraduate Research
and Creative Activity Symposium

April 6, 2022
John C. Myers Convocation Center

A Letter from the Dean

Welcome to the thirteenth annual College of Arts and Sciences Undergraduate Research and Creative Activity Symposium at Ashland University. Modeling the format of a professional conference, students and guests will present original research, read original creative writing, and exhibit new works in design and fine art.

Undergraduate research and creative activity when mentored or in collaboration with a faculty member serves the institution's primary purpose of enhancing the educational experience of our students. The experience gained within the structure of this symposium enables engaged students to present at other conferences, author and/or co-author publications in professional journals, compete and perform at state, regional and national levels, and exhibit work in a variety of venues.

Students who participate in undergraduate research in any discipline are better prepared for post-graduate work or graduate studies and are challenged in ways that prepare them for future research, critical thinking, and effective speaking and communication.

The URCA symposium is a celebration of the relationships between students and faculty that truly share an accent on how a mutual joy of learning leads to what are often life-long professional relationships. We are delighted to share and highlight the outstanding work conducted by students across the many disciplines in the College of Arts and Sciences.

All the best,

Daniel McDonald, Interim Dean
College of Arts & Sciences

The College of Arts & Sciences at Ashland

The College of Arts & Sciences is a vibrant academic community at the heart of the university undergraduate experience. Grounded in liberal arts, students prepare for careers in science, business, the arts, education, communication, government and service organizations as well as for pro-fessional programs and graduate school.

Ashland University Mission Statement

Ashland University, guided by our Christian heritage, is a comprehensive, private university that provides a transformative learning experience, shaping graduates who work, serve and lead with integrity in their local, national, and global communities.

Undergraduate Research and Creative Activity Symposium Committee

Chair, Dr. Christopher Swanson, Professor, Mathematics
Mr. Mohsine Bensaïd, Interim Director, Writing & Communication Center
Dr. Scott Garlock, Professor, Music
Dr. Nicholas Johnson, Associate Professor, Chemistry
Dr. Peter Mallik, Assistant Professor, Psychology
Dr. Wendy Schaller, Associate Professor, Art History
Dr. Kelly Sundberg, Assistant Professor, English
Dr. Robert Wyllie, Assistant Professor, Political Science
Ms. Krystal Hamilton, Administrative Assistant (Program Design and Layout)

Contents

Oral Session I
9:00-10:15 a.m.
Trustees Room

Erin Sievers.....	8
Christopher J. Triner.....	9
Blake Goodson, Maverick Duncan, Matthew Hall.....	10
Dr. Lindsey Knapp.....	11

Oral Session II
10:30-11:30 a.m.
Trustees Room

Caitlin Puff.....	14
Cassandra Burnham, Carolina Carlton, Maeve Kelly, Zachary Kistler, & Alexis Yoder.....	15
Emma Walls & Huijie Zhang.....	16
Ardith Amon.....	17

Oral Session III
10:30-11:30 a.m.
Faculty Room

Tia Shanklin.....	20
Tiffany Sims.....	21
Sarah Fisher.....	22

Poster/Exhibition Session I
11:45-12:45 p.m. Alumni
Room

Bria Meisse	24
Sophie Dahn	25
Erin Sievers.....	26
Kyle Nebergall & Omar Ajwa.....	27
Juliann Dodd Mya Weis.....	28
Joshua Davis II.....	29
Amanda Cicila.....	30
Madison Whipp.....	31
Hannah Hill, Michael Krohn, Nathan Langdon, Hope Miracle, Kailyn Ritenour, Joel Steiner, Erica Talion, & Lennard Zarndt.....	32

Poster/Exhibition Session II
12:45-1:45 p.m. Alumni
Room

Stuart Brdicka.....	34
Kirstan Franklin.....	35
Tyler Snodgrass.....	36
Shila Hartzler, Kendal Meyer, Maeve Kelly, Cassandra Burnham, Alexis Yoder.....	37
Tyler Mothersbaugh & Sophie Dahn	38
Miranda Bielawski	39
Destiny Whitmer Jaycee Lappin	40
Maykahla Gain Zoe Shellenbarger	41
Allison Kesner.....	42

Oral Session IV
2:00-3:00 p.m.
Trustees Room

Ashli Lucio.....	44
Taylor Kroll.....	45
Jalyn Allen, Katie Foster, Kendal Meyer, & Shila Hartzler.....	46
Clay Atkinson, Kane Feldhake, Jordan Gray, & John-Tyler Sprankle.....	47

Oral Session V
3:15-4:15 p.m.
Trustees Room

Amar Sapcanin, Jacob Owens, & Steven Short.....	50
Joseph Macdonald.....	51
Lexi Weyer.....	52
Trinity Stout.....	53

Oral Session I
9:00-10:15 a.m.
Trustees Room

Love Thy Neighbor

Erin Sievers

Student's Major: Psychology

Faculty Sponsor: Dr. Kelly Sundberg, English

“Love Thy Neighbor” is a short story, part of a larger collection entitled “Glutton,” that is set in a dystopian future in which material goods have become more important than one’s own personal health. The themes of the piece revolve around the negative effects of capitalism and how it encourages members of its society to continually work exhausting hours not only to sustain themselves, but also to boast what wealth they’ve earned. What is the line between comfortable living and excessive spending? Can one ever truly have a satisfying amount of riches to their name, or does greed run deeper than the conscious level? “Love Thy Neighbor” seeks to answer these questions, amongst many others, by following the main character of Blaire as she and her husband attempt to navigate the social and material life of their new neighborhood. Through two major scenes—one a humiliating dinner party, the other a disastrous neighborhood-wide yard sale—and literary devices such as metaphors, symbolism, and imagery, my hope is that the reader will be inspired to explore the truth of human nature regarding gluttonous behavior, intertwined with the urgent necessity to improve others’ perceptions of oneself.

High Impact Workout... Grit, Growth & Gratitude Christopher J. Triner

Chris Triner is a 1991 and 2001 Ashland University graduate. Chris' priority as a teacher has always been creating opportunities for his students using the arts as a force for change. As part of his commitment, he has coordinated various grants, and community initiatives for students. In addition to teaching, he is the district's co-lead instructional teacher; coordinating mentoring and new teacher education. For his efforts, Chris was awarded The North Canton Chamber of Commerce "Arts Advocacy" award in 2021, the inaugural Stark County Outstanding Art Educator of 2020, and the 2006 Martha Holden Jennings Master Teacher Award for the state of Ohio. As a professional artist, his own work is in private collections across the country. With his wife, fellow AU Eagle Brenda (Marcus) Triner, they are raising two children.

The benefits of physical exercise have been widely touted for many generations, but perhaps lesser known is the wellness practice that is beneficial for all—the use of three key “stretches.” Using focused goals in our work (grit), reflecting on our personal improvement (growth) and how we can use it to be an agent for change, and finally showing outward signs of appreciation for those around us (gratitude). By implementing these strategies into our daily lives, each individual has the opportunity to improve their own circumstances and those of the people around them. Each of these actions becomes part of one’s leadership collateral.

Atlas Studio Yoga Asana Project

Blake Goodson, Maverick Duncan, & Matthew Hall

Students Major: Computer Science

Faculty Sponsor: Dr. Selvanayaki Kolandapalayam Shanmugam,
Computer Science

Our team will be developing an Android Application for Atlas Studio called YogaFX. YogaFX will focus on certain yoga prescriptions for general health and other illnesses such as headaches, back pain, and even different types of diabetes. Conveying Yoga lifestyle medication, history, and information for different intended results will be our primary goal. YogaFX will be structured with multiple sections and subsections of different yoga poses, history of where it came from and simple lifestyle hacks for common ailments. The opening consists of the title, “YogaFX,” showcases different yoga postures with a brief description of how to complete each posture, including photos, videos, text, brand cards, icons, etc. provided by Atlas Studio through different media channels such as Slack and Trello. The different courses include activities involving the posture, descriptions to ensure the understanding of each posture, and video content to provide additional information. The project includes the development of creative style and layout of the mobile application for each yoga posture for the various intended outcomes. In this project, the development team focuses on creating a gallery formatted homepage using various software such as Android Studio, and Figma for the development of this application. The development team will be working with Atlas Studio while using communication software applications such as Slack, Trello, and Canva. This will be a personalized mobile application for those in pain, ill, or simply working on themselves.

Rab11a: A Small Piece of the Hearing Puzzle Dr. Lindsey Knapp

Lindsey Knapp is a 2013 graduate of Ashland University who majored in biology. With a focus on research, Lindsey presented at two URCA symposiums with her undergraduate research and participated in summer research programs at Johns Hopkins University and The University of California at Berkeley during her time at Ashland. Lindsey earned her Ph.D. in Biochemistry, Cell, and Developmental Biology at Emory University (2019), researching hearing and the inner ear. While at Emory University, she found her passion for teaching. Following graduation, Dr. Lindsey worked as a Genetic Variant Curating Scientist at Otogenetics Corporation, then at OSU-Lima teaching a variety of biology classes. Currently, Dr. Lindsey is the lead Anatomy and Physiology Faculty at Marion Technical College where she has been revamping the program to reflect modern practice and developing new curriculum for new science courses.

Hearing is something that most of us do everyday. However, there are a multitude of microscopic structures needed to allow this seemingly simple process to occur. A variety of mutations can impair hearing, rendering even the loudest sound inaudible. Some of us will undergo hearing damage from loud sounds we encounter during our lifetime. In order to understand hearing further, scientists are studying hundreds of proteins involved in the process. Rab11a, a protein known for its role in protein trafficking, moving proteins throughout the cell, plays a vital role in hearing. Mice deficient in Rab11a protein are deaf, with malformed hearing apparatus. While this discovery is only part of the puzzle, it puts the field one step closer to understanding how hearing works. Now, extending beyond the bench, I use the lessons learned through years of research to troubleshoot, teach students, and explain physiological processes in the classroom.

Oral Session II
10:30-11:30 a.m.
Trustees Room

Using CRISPR Gene Editing to Explore the Role of RNA Binding Proteins in Eye Lens Development

Caitlin Puff

Student's Major: Biology
Faculty Sponsor: Dr. Mason Posner, Biology

Cataracts are the leading cause of blindness worldwide, affecting an estimated 95 million people in 2014 according to the World Health Organization. We know that malfunction of lens proteins called crystallins causes protein aggregation leading to cataracts, but little is known about the role that RNA binding proteins (RBPs) play in the lens. Only four RBPs have been found to function in the lens, and deletion of those genes were linked to cataracts, small, underdeveloped eyes, or no eyes at all. Therefore, the goal of my project was to examine the function of two additional RBP genes, *csdc2a* and *csde1*, that preliminary data suggested may be involved in lens development. We used CRISPR/Cas9 gene editing to delete these two genes in zebrafish, a model species used to study eye development. Zebrafish lacking either *csdc2a* or *csde1* were identified using PCR, and abnormalities were analyzed by DIC microscopy. Forty-one percent of fish injected with a gRNA mix damaging *csde1* showed abnormal phenotypes, as well as 71% of *csdc2a* knockout fish. Characteristic oval pits predominated in the *csde1* knockouts, while irregular fiber cell boundaries were the primary phenotype in the *csdc2a* knockouts. We produced the first evidence that *csdc2a* and *csde1* are involved in lens development, expanding the list of known lens-related RBPs and will further explore their role in lens biology.

Encouraging Ashland Residents to Shop Local: A Campaign Project to Support Ashland Area Chamber of Commerce

Cassandra Burnham, Carolina Carlton,
Maeve Kelly, Zachary Kistler, & Alexis Yoder

Students' Majors: Public Relations & Strategic Communication
CB, CC, MK, ZK, AY) & Religion (CB)

Faculty Sponsor: Dr. Olga Monacell, Communication Studies

This presentation will report on a public relations campaign project that was planned and implemented in February and March 2022 in partnership with the Ashland Area Chamber of Commerce (the Chamber). The project involves two components: (1) key public/audience research and 2) creative digital content. A primary research study of Ashland residents was conducted in February. Its findings shed light on the respondents' knowledge and attitudes about local businesses—members of the Chamber, as well as their preferred sources of news and social media usage. Based on these research results, message and media strategies were designed to target key publics/audiences. In addition, creative content was produced including textual and audio-visual stories. These messages and stories encouraging Ashland residents to shop local were presented to the Chamber to be used across its multimedia platforms.

Web Application for Automation of Book Writing

Emma Walls & Huijie Zhang

Students Majors: Computer Science (HZ, EW)
Mathematics (HZ)

Faculty Sponsor: Dr. Selvanayaki Kolandapalayam Shanmugam,
Computer Science

The project is to create a Web-based application that helps authors to answer the different stages of their requirements with text-based questions & answers. This project is developed for **Author Bridge Media ABM**), a book publishing company, to replace the traditional method of data collection through interview sessions with authors. Software packages like Chapterly, Zoho Writer are all-in-one apps for writing a book and using Artificial Intelligence (AI) technology. But, this application is customized as per the core requirements of Automation of Book Writing for ABM. The application provides excellent usability and integration with different phases of requirement collection from the user. The application development includes designing web pages through which user interaction occurs, designing and creating the database structure, and generating the report. This application generates the report of all the users/authors' questions and answers, which helps ABM initiate book writing. The client-side scripting tools like HTML, CSS, Javascript, and Server-side scripting tools like PHP are used to develop this application. This project is entirely text/question-answer-based, highlighting the limitations of audio/video capabilities. The presentation will include the different processes of our project, describing the requirements, the design, and the development of web pages highlighting the project's objective.

Institutions Are Not Enough: Jefferson and the Adamses on the Importance of Republican Education

Ardith Amon

Student's Majors: History & Political Science
Faculty Sponsor: Dr. Cara Rogers, History

Many early American political thinkers who helped found the United States upon principles of self-government believed that the people must be educated in these principles for the new republic to succeed. While most recognized the importance of education, others, most notably James Madison, emphasized how well-designed institutions of government would protect republican principles of self-government more than education. Although scholars who focus on arguments surrounding the United States Constitution find this education on institutions, the importance of civic education becomes evident when examining the letters of prominent early American political thinkers. This paper examines the correspondence of John Adams, Abigail Adams, and Thomas Jefferson in order to demonstrate how this civic education cultivates the virtues necessary for self-government. Furthermore, this paper addresses the differing views about who ought to be educated for self-government, specifically the cases made for educating women as future leaders of the republic, and the limits of these arguments.

Oral Session III
10:30-11:30 a.m.
Faculty Room

Daydreamer

Tia Shanklin

Student's Major: Creative Writing & English
Faculty Sponsor: Dr. Kelly Sundberg, English

“Daydreamer” is an essay that tells my story about the discovery of, and subsequent dealing with, my maladaptive daydreaming and aphantasia. Maladaptive daydreaming, also known as daydreaming disorder, is where a person regularly experiences intense daydreams that distract and cause the person to stop whatever task they were undertaking originally. The essay shows the struggle of facing reality in a world where suffering is rampant, along with the desire to make the impossible possible. I also touch on a phenomenon that has been recorded in about two to three percent of people called aphantasia, which is a phenomenon in which people are unable to visualize imagery. Personal narrative has the capacity to both educate and foster empathy. My goal is to use my own experiences with maladaptive daydreaming and aphantasia to help others understand the battles I've faced, as well as offer a glimpse into what a neurodiverse mind could look like.

All My Sons: An Exploration of the Moral Dilemmas of Post-WWII America

Tiffany Sims

Student's Majors: Theatre, Political Science, & Religion Faculty
Sponsor: Dr. Teresa Durbin-Ames, Theatre

All My Sons, a play written by Arthur Miller in 1947, tells the story of the owner of an aircraft engine factory, Joe Keller, who allowed a batch of cracked cylinder heads to be shipped out that caused the death of twenty-one airmen. The play examines the aftermath of the decision and the moral dilemmas that arise for Keller and his family. This project examines the themes, historical context and key terms of the play, as well as the life of its author. Miller's experience of the Great Depression influenced him as a playwright and shaped his critiques of American society. The play is based on a true story and, in characteristic Miller fashion, it brings to light the struggles and reality of the common man in America. Miller shows how the average American is affected by postwar life in which economic prosperity is combined with a growing sense of disillusionment. The idea of honor, which seemed straightforward in wartime, is deeply challenged by the individualistic society of peacetime America. Theatre can encourage audiences to empathize with others. Miller's *All My Sons* uses theatre to facilitate emotional learning that can go deeper than historical analysis. This project explores how Miller's play, while set in 1947, continues to be relevant today by asking important questions about morality in a capitalistic society and exploring the struggle between individualism and moral obligations to society.

Adolescent Perceptions of Older Populations

Sarah Fisher

Student's Major: Psychology
Faculty Sponsor: Dr. Christopher Chartier, Psychology

Studying ageism is important because there are many damaging effects that ageism can have on older people. Ageism decreases older people's self-esteem, their cognitive abilities, and can cause heart-related problems and a decrease in lifespan (Flamion et al., 2019). The purpose of this study was to examine the perceptions that students have towards older adults compared to younger adults when both groups are viewed alone versus in a group. Participants were shown a series of photos through a slideshow. The slides showed young people alone, older people alone, and individual young and older people on a slide with other images of individual people of that age group to simulate a group setting. Participants completed a 23-item semantic differential scale measuring their perceptions for each slide (Sanders, Montgomery, Pittman, & Blackwell, 1984). A 2x2 ANOVA was used to analyze the data. The results showed that the mean perceptions score for the images of younger people ($M = 80.57, SD = 12.76$) were statistically significantly different (more positive) than the mean perceptions score for the images of older people ($M = 82.17, SD = 11.60$), $F(1, 113) = 5.842, p = 0.017$. The main effect of state (whether they were alone or in a group) was not statistically significant, $F(1, 113) = 2.958, p = .089$. These results add further evidence to the current literature about how adolescent perceptions about older populations are generally negative.

Poster/Exhibition Session I
11:45-12:45 p.m.
Alumni Room

Local Businesses: Entrepreneurs of Happiness

Bria Meisse

Student's Major: International Business
Faculty Sponsor: Dr. Robert Wyllie, Political Science

Since the 1960s, social capital has steeply declined as people become less connected with one another. Unfortunately, social capital is thought to significantly contribute to happiness in communities. Over these same decades, large corporations have continued to expand market share within the United States, making it more difficult for new entrepreneurs to open and sustain small businesses. Since small businesses are thought to especially contribute to social capital, there appears to be a correlation between the decline of social capital and the dwindling market share of small businesses. This cross-sectional study examines two relationships: between small business density and social capital and between social capital and happiness. By showing how small businesses contribute to social capital, this paper seeks to demonstrate to public officials in local government that their constituents will be more satisfied with their lives and happier, and therefore more likely to reelect them, if they pass legislation that encourages entrepreneurship and helps to sustain small business.

Essential Oils and Memory Function

Sophie Dahn

Student's Majors: Psychology & Biology
Faculty Sponsor: Dr. Mitchell Metzger, Psychology

Essential oils can have an array of positive effects on anxiety, sleep, skin irritation, and digestive functioning. Rosemary oil, in particular, has been found to improve memory due to its neuroprotective effects and its ability to lower cortisol levels and reduce tension (Elahe et al., 2018). Filiptsova and colleagues (2017) found clear results that linked rosemary essential oil to improvement in memory of numbers and images, but there had not been many studies investigating the effects of diffusing the oil. Thus, it was hypothesized that a group that had rosemary diffused during both the stimuli presentation and during the memory test would remember the most words during recall and recognition tests. Seventy-two Ashland University students were randomly assigned into three groups: Group one had rosemary diffused during both the stimulus presentation and the memory test, group two had rosemary diffused only during the test, and group three had no rosemary diffused. The students viewed a PowerPoint with 19 words, completed two mathematical filler tasks, then took both a recall and recognition test. One-way ANOVAs were run on recall and recognition data which revealed that there were no significant differences between any of the groups. A potential limitation of this study included the COVID-19 requirement to wear masks, which may have inhibited the students' sense of smell.

Effects of Mental Imagery on Athletic Performance

Erin Sievers

Students Major: Psychology
Faculty Sponsor: Dr. Diane Bonfiglio, Psychology

Athletes from any sport and across all ability levels are always seeking new strategies to improve their performance outcomes in training or at competitions. One such strategy is mental imagery, defined as picturing in one's mind—by utilizing the appropriate senses—the exact experience one wishes to physically recreate (Weinberg, 2008). Mental imagery has been shown, through the findings of various studies, to be an effective strategy for improving physical performance in athletes (Kendall et al., 1990; Wrisberg & Anshel, 1989). The purpose of the current study was to determine if a mental imagery intervention will improve free throw performance outcomes. Participants first shot thirty free throws to get a baseline for their current free throw ability, then those in the experimental group listened to a two minute mental imagery recording that incorporates multiple senses, specifically including sensory cues for sight, hearing, and touch. Those in the control group listened to a two minute recording of white noise. Participants from both groups then shot thirty more free throws to see if there was any improvement. The results were analyzed using an independent t-test. The experimental group ($n = 35$) made more free throws during the second free throw session ($M = 2.51, SD = 3.71$) and the control group ($n = 40$) performed similarly ($M = 1.73, SD = 3.59$). There was no significant difference between the two groups ($t(73) = .935, p > .05$). These results suggest that participating in mental imagery before shooting free throws does not enhance performance outcomes.

Modified Phosphazenes as Drug Delivery Systems

Kyle Nebergall & Omar Ajwa

Students Majors: Biochemistry
Faculty Sponsor: Dr. Nicholas Johnson, Chemistry

Many highly active pharmaceuticals are largely lipophilic, which poses a challenge in drug delivery. Some of these challenges can be overcome by using a drug delivery system. Polyphosphazenes $[\text{PCl}_2\text{N}]_3$ have long been known to have many properties that make them beneficial in biological applications. As opposed to long chain phosphazene polymers, our research has been directed towards cyclophosphazenes, specifically $[\text{PCl}_2\text{N}]_3$. Phosphazene rings are inexpensive and can easily be substituted with different molecules. Tetraethyleneglycol monomethyl ether (TEGME) can be substituted onto the cyclophosphazene to increase its hydrophilicity while still leaving sites readily available for further substitution. Recently, imidazoles have gathered much attention and have been shown to be effective anti-cancer agents. Unfortunately, imidazoles have low aqueous solubility. To incorporate the use of imidazoles and make them viable drug candidates, they can be substituted on to the synthesized cyclophosphazene and TEGME drug delivery system to increase their solubility. To further study how hydrophilicity and lipophilicity affect the imidazole, the cyclophosphazene can be modified to have more lipophilic ligands. Instead of using the TEGME, 2,2-biphenol was reacted with the cyclophosphazene to create a highly lipophilic compound that will allow the imidazole activity to be evaluated. Once the lipophilic compound was synthesized, the imidazole, the hydrophilic phosphazene, and the lipophilic phosphazene could all be evaluated for anti-cancer activity. The results of this study were characterized with multi-nuclear magnetic resonance (NMR) spectroscopy, Infrared (IR) spectroscopy, and mass spectrometry.

Progress Towards the “Large-Scale” Synthesis of Six- and Eight-Armed Calixarene-Core Polylactide/Polyethylene Glycol Star Block Copolymers

Juliann Dodd and Mya Weis

Students' Majors: Environmental Science-Toxicology (JD),
Biology (JD), & Biochemistry (MW)
Sponsor: Dr. Perry Corbin, Chemistry

The synthesis and study of new polymers with unique molecular architectures is the focus of our research group, as distinctive polymers have a potential for use in drug-delivery and other biomaterial applications. Our research focuses on the synthesis of six-armed and eight-armed calixarene core polylactide-polyethylene glycol star block copolymers. These polymers consist of a central macrocyclic core surrounded by six or eight polymer arms. Previously, our research group established optimal conditions for the synthesis of calixarene initiators, developed polylactide (PLA) growth, and constructed a method for alkyne attachment to PLA components. In this presentation, we will describe our work to establish conditions for the attachment of polyethylene glycol (PEG). Six-armed and eight-armed alkyne functionalized star PLAs have been prepared and nuclear magnetic resonance (NMR) spectroscopy has been used to determine the ratios of catalyst and PEG needed for attachment. We have focused on employing optimized conditions from small-scale NMR reactions in the larger-scale synthesis of calixarene core PLA-PEG star block copolymers. A large-scale synthesis is an important step in developing a potential drug-delivery system and will be helpful in future micelle formation studies. Polymer micelles are best described as soap-like aggregates of polymer molecules that have immense potential in drug-delivery due to their hydrophobic core and hydrophilic exterior. A linear PLA-PEG, resembling an arm of a calixarene-core star polymer, is also being synthesized alongside the star polymers. Both the linear copolymers and the star block copolymers, effectiveness in forming micelles and entrapping model drug compounds will be investigated.

Isolation and Characterization of Bacteriophage from *Vicugna Pacos* Joshua Davis II

Student's Major: Biology

Faculty Sponsor: Dr. Paul Hyman, Biology

Bacteriophages are viruses which infect bacteria. Bacteriophages are a diverse group and may be highly specific as to which bacterial strains they can infect. These viruses likely play a key role in the diversity, species-richness, and development of the intestinal microbiome. The microbiome is a crucial part in animal health and digestion especially in ruminant animals. Ruminants have highly complex digestive systems which rely heavily on the presence of a healthy microbiome. *Vicugna pacos*, or the alpaca, is a modified ruminant. Four bacteriophages from alpaca feces were isolated using *Bacillus cereus*, *Bacillus thuringiensis*, and *Escherichia coli* as isolation hosts. The bacteriophages were then characterized using the development of a host range profile, capsid stability testing, and DNA extraction for restriction enzyme digestion and genomic analysis. Using these methods, it was determined that the four bacteriophages were distinct specimens. The isolation and characterization of new bacteriophage species could play an important role in fighting the rise of antibiotic resistance in bacteria.

A Comparison of Lead Accumulation in Non-Migratory Birds Inhabiting Older Neighborhoods with Lead-Based Paint to Birds Inhabiting Newer Neighborhoods Without Lead-Based Paint (post 1978)

Amanda Cicila

Student's Major: Environmental Science - Biology
Faculty Sponsor: Dr. Patrica Saunders, Biology

Many studies have shown that lead from lead paint enters the soil and makes its way into the food chain via soil dwelling insects that as flying adults can pass the lead on when eaten by insectivorous birds. This can result in bioaccumulation as it passes through the trophic levels. Birds with increased lead levels show signs of weakness, paralysis, inability to fly, weight loss and even loss of vision. Soil samples were taken at all sites in transects extending out from the homes in older residential neighborhoods have significantly higher lead levels in the samples taken closer to the house compared to the more recently built neighborhoods. At each site, 3 soil samples were taken: the first was right against the foundation, the second was 10 feet from the house, and the third was 20 feet from the house. This research project is focused on the comparison of lead level contamination in non-migratory birds from older residential locations where lead exterior paint has been used in the past, to birds from newer (post 1978) residential areas where lead paint has not been used. We hypothesize that birds living in the older neighborhoods will have higher lead levels compared to those birds from post 1978 neighborhoods. We caught birds at several sites, took feather samples from non-migratory species and analyzed them via nitric acid digestion (performed via OARDC and STAR labs) for different toxin levels, including lead. Non-migratory species were preferred because we knew they were local birds, and were not likely to travel far from their capture sites.

Chloroplast DNA Haplotype Variation in Common Milkweed (*A. Syriaca*) Madison Whipp

Student's Major: Biology

Faculty Sponsor: Dr. Soren Brauner, Biology

Milkweed (*Asclepias syriaca*) is being used as a model organism to study local adaptation because it has a wide distribution and shows regional differences for growth traits and leaf chemistry. Neutral, non-selected genetic markers, which provide a measure of genetic distance as a result of how long populations have been separated, have also been used for analysis of populations. *A. syriaca* seeds from several locations throughout the northeastern United States were grown in three common gardens at other universities to observe whether locally collected seeds grew better than distantly collected seeds. These populations had cpDNA sampled to analyze the various haplotypes present. Chloroplast haplotypes can be utilized to determine information on the genetic inheritance of a plant and where the population has descended from. This is due to the fact that cpDNA has uniparental inheritance from the seed parent, so there is no recombination or assortment of genes. DNA was extracted from young leaves, and PCR (Polymerase Chain Reaction) was performed using three sets of universal primers for non-coding regions, which can be used for the DNA of any flowering plants, to identify these haplotypes: *ndhF* + *rpl32-R*, *trnL* + *rpl32-F*, and *trnS* + *trnG*. The PCR product was sent to Functional Biosciences for Sanger sequencing. The sequences were used to identify the different cpDNA haplotypes, which helps to characterize the populations. The sequences were aligned and will be analyzed in cladograms to look at the relationships between populations. The results of the cladograms and diversity will be presented.

Brand Identity and Product Package Design

Hannah Hill, Michael Krohn, Nathan Langdon, Hope
Miracle, Kailyn Ritenour, Joel Steiner, Erica Talion,
& Lennard Zarndt

Students Majors: Graphic Design (HH, MK, HM, KR, JS, ET, LZ),
Fine Art & Digital Media Production (NL)
Faculty Sponsor: Prof. Michael Bird, Art

Branding is the method of presenting a distinctive identity through consistent design and messaging. Graphic designers are tasked with solving this aesthetic puzzle by producing content that represents what a company stands for. They do this through logos, color choices, and much more. As seniors, graphic design majors are challenged to create a brand of their own and to reflect their company through a brand identity. Although all the projects are independent, everyone had the same challenges and criteria. First, we researched brands and companies that inspired us and came up with a target market for our brand. From this, we created our own unique brands and made aesthetic decisions about logo design, color palettes, and typefaces that best represented our chosen company. After our initial designs, we produced a stationary set including business cards, letterhead and envelope designs, product packaging, and advertising materials. Finally, we constructed our own marketing spaces that further extended our brand identity. Overall, our goal was to create a consistent visual identity for the brand and to engage our specific target markets to buy our products or engage in our services. Exhibiting our work as a group will showcase strong design principles such as: typography, proper spacing/scaling of elements, color theory, 3D design, and more. Viewers will be able to see professionalism in our group as we produce high quality work for graphic design clients. In addition, viewers will be able to see the different styles of design that we have each acquired and applied to our distinctive brand identities.

Poster/Exhibition Session II
12:45-1:45 p.m.
Alumni Room

The Timeline of α B -crystallin Expression Change in Zebrafish Eye Lens Development

Stuart Brdicka

Student's Major: Biology
Faculty Sponsor: Dr. Mason Posner, Biology

Maintaining clear vision is important for the survival of most vertebrates. Eye lens cells lose their nuclei to promote transparency, which means as the organism ages, existing protein in the lens can break down and aggregate causing cataracts, the world's leading cause of blindness. The protein α B -crystallin can prevent protein aggregation, limiting the formation of cataracts. In zebrafish, α B -crystallin occurs as two paralogs, or versions, called α B a- and α B b-crystallin. Previous research indicated that α B -crystallin expression in adult zebrafish differs from young larval stages. However, the timing of this transition in expression pattern is not known. The goal of this study is to determine at what age this transition of expression occurs so that we can better understand α B -crystallin function. Lenses were dissected from wild-type fish ranging in age from 10 days to 5 weeks. Quantitative polymerase chain reaction was used to measure the expression level of both α B -crystallin genes in the lenses. Our lab previously showed that neither α B -crystallin gene is expressed in lens tissue at 5 days post-fertilization (dpf). Our latest results showed expression of both genes in the lens at 19 dpf, with increasing levels at 5 weeks. These data suggest that the transition to lens expression occurs between 5 and 19 dpf. α B a-crystallin gene levels are higher than α B b-crystallin at both 19 dpf and 5 weeks. This is an expected result because α B a-crystallin is only expressed in the lens in adults while α B b-crystallin is expressed in many tissues other than the lens. These results are relevant to further understanding the changing role of α B -crystallin during zebrafish eye lens development.

Using Zebrafish to Examine the Role of Gamma N-crystallin in the Eye Lens

Kirstan Franklin

Student's Major: Toxicology
Faculty Sponsor: Dr. Mason Posner, Biology

The function of the eye lens is dependent upon proteins called crystallins, many of which are known to prevent cataracts (cloudiness in the lens). The gamma crystallins are diverse and have been implicated in cataract formation. However, there are few studies examining the role of one member of this group, gamma N-crystallin. Therefore, we investigated the two copies of the gamma N-crystallin gene in zebrafish to explore what role this protein plays in the vertebrate lens. Previously, our lab showed that transient disruption of each zebrafish gamma N-crystallin gene *crygn1* and *crygn2* using CRISPR/Cas9 guide RNA injections produced noticeable defects in the lens during development. Our goal in this present study was to use two CRISPR guide RNAs to produce large deletions in each gene so that we could generate populations of zebrafish lacking either *crygn1* or *crygn2*. We tested the genotypes of mutated fish by purifying genomic DNA from fin samples and using PCR to determine if each gene contained the predicted deletion. Identified heterozygous mutant fish were mated and their offspring's lenses were imaged with DIC microscopy. Fiber disorganization and pitting were present in approximately 40% of *crygn2* mutant offspring at varying levels. These results indicate that we successfully produced a deletion mutation in *crygn2*, and that gene disruption led to abnormal lens development. We are continuing to work on generating a mutant line for *crygn1*. Both mutant lines will allow our lab in the future to examine how gamma N-crystallin gene loss leads to lens defects.

The Role of the Transcription Factor Sox1 in Zebrafish Eye Lens Development

Tyler Snodgrass

Student's Major: Biology

Faculty Sponsor: Dr. Mason Posner, Biology

Cataracts are a common aging disease that impacts vision in more than 24 million people in the United States over the age of 40. Cataracts occur when proteins in the lens lose their structure and aggregate, preventing the normal passage of light to the retina. The normal function of the lens is dependent on proteins called transcription factors (TF) that coordinate the use of genes and production of lens proteins. One TF known to play a role in the production of the lens of mammals is Sox1. However, the details of its function are unclear. Zebrafish present two Sox1 gene copies and this allows us to investigate their function in novel ways. We used CRISPR/Cas9 gene editing to damage the genes *sox1a* and *sox1b* and examined resulting zebrafish larvae at 3 and 4 days of age using differential interference microscopy. Early data suggest that 62% percent of *sox1a* mutated fish and 53% of *sox1b* mutated fish showed either abnormal gaps between lens fiber cells or pitting in the lens. Fiber cell gaps were three times more common than pitting. These data suggest that lens development is affected by damage to either Sox1 gene. Follow up studies will explore the molecular role of each zebrafish Sox1 gene in coordinating lens development and function, such as their role in controlling the expression of another important lens TF, Pax6. Our results can provide insights into lens biology and cataract formation.

An Examination of Attitudes and Language Use Regarding Housing Instability in Ashland, Ohio

Shila Hartzler, Kendal Meyer, Maeve Kelly,
Cassandra Burnham, & Alexis Yoder

Students Majors: Public Relations & Strategic Communication
SH, KM, MK, CB, AY) & Religion (CB)
Faculty Sponsor: Dr. Gwen A. Hullman, Communication Studies

The research investigates two main questions related to the topic of housing instability in Ashland, Ohio. Housing instability is defined as “the inability to maintain a place of residence due to multiple ongoing personal and economic difficulties” (Rollins et al., 2012, p. 625). First, we examine mediated community rhetoric regarding housing instability and related issues for the local Ashland area. This investigation includes a content analysis of major news outlets and community bulletins. Text from stories is subjected to metaphor and framing analysis for root attitudes toward housing instability issues. Second, we canvassed the local geographical area to identify places where we can talk directly to residents to compare the mediated rhetoric to community attitudes. Our analysis provides insight into the concept of housing instability, attitudes about housing instability, and possible barriers or opportunities to future policy pathways and resources.

Assessing the Generalizability of Visuospatial Bootstrapping

Tyler Mothersbaugh & Sophie Dahn

Students Majors: Biology (TM, SD) & Psychology SD)
Faculty Sponsor: Dr. Peter Mallik, Psychology

The purpose of this study was to determine whether displaying numerical information differently would affect a participant's ability to recall specific numeric sequences. To do so, participants at the undergraduate college level completed a working memory recall task. The hypothesis was that when the stimuli are presented in a way that is familiar and has a pattern, such as the clock or the number pad, participants will do better than if they were asked to recall the numbers without a visual array. This is known as Visuospatial Bootstrapping, and it is thought to develop through repeated exposure to familiar patterns and displays, such as the ones used in this study. Numbers were presented as either a clockface, a typical keypad "TKP", singly (with no visual array), or in a mixed combination of the clock and TKP presentations. Participants were shown a series of numbers using the different presentation arrays and were then asked to recall the sequence. This was repeated using different sequence lengths/stimulus loads, which ranged from 5-8 numbers total. In total, each participant was exposed to a total of 64 series of numbers, or 16 from each presentation fashion. Currently, the collected data suggests that there is an effect of stimulus presentation type on recall performance. The "mixed" method of presentation, for instance, seems to have had an overall lower recall rate than the other methods. This implies that participants had a significantly easier time recalling information when it was presented in familiar patterns consistently, rather than not.

The Relationship Between the Continued Influence Effect and Mediums of Reading

Miranda Bielawski

Students' Major: Psychology

Faculty Sponsors: Dr. Peter Mallik, Psychology

The continued influence effect has been defined as the phenomenon where false claims and information continue to leave an ongoing impression on a person's memory and reasoning even after correction. There is significant evidence that a retraction of false information is not completely enough to stop a person from being influenced by or repeating false information in the future, even after acknowledging that it is factually incorrect (Ecker et al., 2013; Lewandowsky et al., 2005; Rich Zaragoza, 2016). The purpose of the current study is to examine whether the medium of reading an artificial news report (Johnson and Seifer, 1994; Rich & Zaragoza, 2016) that presents misinformation and later provides a correction, effects how reliant an individual will be on the misinformation when presented with a questionnaire. To determine the relationship between the Continued Influence Effect and the medium of reading information, college students were asked to read the news report either on paper, on a laptop, or on a smartphone, and were then asked to answer a questionnaire about the details of the article. Misinformation has grown to become alarmingly prevalent on the internet, especially over the past several years with the rise of both medical and political "fake news." It is the hope of this study to gain further insight into the different factors of the continued influence effect, in order to assist research in finding better ways of keeping the public correctly informed about important subjects.

Using Solid-Phase Sediment Extraction (SPSE) with Hydrophobic Pesticide Contaminants in Soil

Destiny Whitmer & Jaycee Lappin

Students Majors: Biology/Toxicology (DW) and Toxicology (JL)
Faculty Sponsors: Dr. Andrew Trimble, Biology/Toxicology
Dr. Jeffrey Weidenhamer, Chemistry

Solid Phase Sediment Extraction (SPSE) is an innovative passive sampling technique that is quick, inexpensive, and adaptable compared to other methods of trace pesticide analysis. Passive sampling uses a collecting medium to accumulate chemical pollutants in the environment. The aim of this study was to use silicone-based tubing to passively sample pesticides from wet sediment. Both currently-used insecticides and legacy insecticides no longer in use, but still detectable in the environment, were studied. The ability of the silicone probes to extract insecticides from sediment was evaluated using dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), methoxychlor, lindane, chlorpyrifos, bifenthrin, and imidacloprid. Using a gas chromatograph equipped with an electron capture detector (GC-ECD) sensitive to halogenated compounds, insecticide residues were detected following hexane extraction of the probes. Results show that the amount of analyte extracted from sediment increased with concentration, duration of probe contact with sediment, and temperature. Sediment samples were then collected from eight different sites at the Black Fork Wetlands to see whether any of the tested pesticides were present. A silicone probe was placed into each sample and remained at a temperature of 22°C for a duration of 14 days. Extraction of the probes and GC-ECD analysis showed that many halogenated compounds were present in the Black Fork sediment samples. The samples potentially contained lindane, chlorpyrifos, and bifenthrin, as peaks were obtained at the same retention times previously studied for these insecticides. This methodology can be utilized for a variety of other applications and future research will include identifying the insecticidal compounds of interest.

Degradation Dynamics of Allelopathic Alkaloids

Maykahla Gain & Zoe Shellenbarger

Students Majors: Toxicology & Environmental Science - Biology

Faculty Sponsor: Dr. Jeffrey Weidenhamer, Chemistry

Syrian rue (*Peganum harmala*) is native to the Middle East but has become invasive in the southwestern US. It contains the alkaloids harmaline and harmine, which have a drug-like effect and can be harmful to humans in high quantities. Previous studies also show that the compounds inhibit plant germination and growth. Both compounds are released to the soil beneath Syrian rue and may impact the growth of neighboring plants. The objective of this study was to determine the stability of these compounds in non-sterile soil and sand. Alkaloids were extracted with buffered acetonitrile/isopropanol and were quantified using high-performance liquid chromatography (HPLC) with fluorescence detection. In a non-sterile sand/soil mix, only traces of the alkaloids were recovered after 24 hours. A follow-up experiment showed that only 4 percent was recovered immediately after spiking the soil mix, however; the variability was high. To test the hypothesis that compounds were binding tightly to the organic matter in the sand soil mix rather than degrading, a third experiment was carried out using pure sand. Recovery of the compounds at time point zero was roughly 75% for harmaline and 16% for harmine and after 24 hours roughly 73% of the harmaline and 9% of the harmine could still be recovered. The data from this experiment also showed high variability. Our ongoing experiments are examining the role of organic matter in adsorbing these compounds, with the goal of determining the lifetime of these alkaloids in sand and soil.

Time-weighted Average Sampling of the Allelochemical Allyl Isothiocyanate

Allison Kesner

Student's Major: Biology

Faculty Sponsor: Dr. Jeffrey Weidenhamer, Chemistry

Many invasive plants are allelopathic, inhibiting the growth of neighbors. *Alliaria petiolata*, garlic mustard, is a notorious invasive species found in North America that releases small amounts of biologically active, volatile chemicals. One of those compounds is allyl isothiocyanate AITC. Isothiocyanates can deter predators, and inhibit the germination and growth of plants and mycorrhizal fungi. AITC is biologically active at micromolar concentrations, and is also released in low concentrations. Volatile compounds are difficult to analyze. Given their low concentrations, one approach is to concentrate compounds on a sorbent material. Solid-phase microextraction (SPME) uses a thin fiber of silicone to trap volatile compounds for analysis by gas chromatography-mass spectrometry (GC-MS). When the fiber is retracted inside a protective needle, volatile compounds are absorbed as they diffuse through the hollow needle into the end of the fiber, a technique called time-weighted averaging (TWA). Our objective was to see whether this approach could be used to analyze AITC. AITC was diluted to a concentration of 100 mg/L using silicone oil. Retraction distance varied from 0.5 to 1.5 cm in the hollow needle, and exposure times were 0, 0.5, 1, 1.5, and 2 hours. All TWA trials were completed in triplicate. Results show a linear response with increasing time, and greater AITC accumulation with shorter retraction distance. Ongoing studies will also explore the effective concentration range for the technique.

Oral Session IV
2:00-3:00 p.m.
Trustees Room

Why Does Genocide Sometimes Result from Persecution? A Case Study of Twentieth-Century Tutsi Persecution and the Rwandan Genocide Ashli Lucio

Student's Major: History

Faculty Sponsor: Dr. Robert Wyllie, Political Science

Although the world said “Never Again” after the Holocaust, genocides continue to occur. Genocide studies scholars develop competing models that attempt to explain when and where genocides are likely to occur. This paper turns to the 1994 Rwandan Genocide as a case study to evaluate the accuracy of these models and their assumptions in the context of a non-Western post-colonial society amidst civil war. Drawing upon Rwandan survivors’ personal narrative testimony, primary documents, as well as scholarly analyses, this study finds the following broadly observed preconditions for genocide present in the Rwandan case: an authority-respecting society, a history of systemic violence and hatred against an identifiable group, and an active power movement politicizing identity. It also finds three additional factors in Rwanda that, while genocide may have occurred in their absence, likely intensified mass killing: a corrupt or failed government, foreign interference, and a powerful media. The paper uses these findings to evaluate contemporary models of genocide and improve our understanding of patterns vital to genocide prevention.

Progress Towards the “Large-Scale” Synthesis of Four-Armed Calixarene-Core Polylactide/Polyethylene Glycol Star Block Copolymers Taylor Kroll

Student’s Majors: Biochemistry & Environmental Science - Toxicology
Faculty Sponsor: Dr. Perry Corbin, Chemistry

An important area of current research is the design and synthesis of polymers for use in biomaterial applications (e.g., drug delivery and antimicrobial agents). Biomaterial applications typically utilize polymers with linear structures; however, my research focus is star-shaped copolymers. The synthesis and study of star-shaped polymers is significant because of the potential for these polymers to have different properties than their linear counterparts. Previous research involving the synthesis of four-, six-, and eight-armed calixarene-core polylactide/polyethylene glycol (PLA-PEG) star block copolymers was conducted to optimize reactions on a small-scale. With these successful efforts, the development of large-scale reactions has begun in order to further progress towards creating micelles for potential use in biomaterial applications. Along with these reactions, a synthesis of a new star-polymer has been carried out in order to increase the size of the polylactide portion of the star polymer arms from 20 to 40 repeat units. This polymer was developed to eventually determine if larger hydrophobic regions could affect micelle formation. This presentation will focus on the optimization and large-scale synthesis of the four-armed calixarene core PLA-PEG star block copolymers. The characterization of the reaction products was conducted using nuclear magnetic resonance spectroscopy and gel-permeation chromatography.

Kids and Adults Outreach: A Campaign Project to Support Ashland Public Library

Jalyn Allen, Katie Foster, Kendal Meyer, & Shila Hartzler

Students Major: Public Relations & Strategic Communication
Faculty Sponsor: Dr. Olga Monacell, Communications Studies

This presentation reports on a public relations campaign project that was planned and implemented in partnership with the Ashland Public Library (the library) in February and March 2022. The library reaches out to the community in many ways including a bookmobile and weekly events that bring residents together. The project involved two components: (1) research and (2) creative content. A primary research study of the library members was conducted in February 2022 to identify the key publics for this campaign—that is, a specific segment of the Ashland Public Library membership that was likely to benefit from the bookmobile services. The research findings helped understand the needs of these key publics, their expectations from the library, and their media habits. Based on the findings from the research study, message and media strategies were designed. Additionally, the campaign involved the creation of content such as feature stories, videos and other types of messages for the library’s social media and other digital platforms.

STEERus Alexa App for Soft Skills

Clay Atkinson, Kane Feldhake, Jordan Gray,
John-Tyler Sprankle

Students' Major: Computer Science

Faculty Sponsor: Dr. Selvanayaki Kolandapalayam Shanmugam,
Computer Science

In the job market today, one thing that hurts many workers is their lack of soft skills, such as time management, critical thinking, and leadership. All of these are essential for individuals to be successful in their jobs. STEERus, our client, aims to provide resources to individuals to improve their soft skills. The goal of this project was to develop an Amazon Alexa Skill which provides an easy method for individuals to access these resources from STEERus. The objective of the application is to create a platform where users can ask Alexa for tips about soft skills or play informative games using their voices. The tools and programming languages used to develop this project include the Alexa Software Development Kit (SDK), Microsoft Office, JavaScript, Java, and JavaScript Object Notation (JSON). This new app will allow users to access the STEERus resources using only their voices.

Oral Session V
3:15-4:15 p.m.
Trustees Room

The Prime Vice Studio Advisor

Amar Sapcanin, Jacob Owens, & Steven Short

Students Major: Computer Science (AS, JO, SS) & Toxicology (SS)
Faculty Sponsor: Dr. Selvanayaki Kolandapalayam Shanmugam,
Computer Science

Most businesses are expanding using technology, especially mobile applications, which can be used as tools to showcase products and services. Clients that visit personal company mobile apps have instant, one-stop access to the company. Prime Vice Studios is a sequential art company specializing in developing comics, graphic novels, character design, and other sequential art assets and in preparing them for intellectual property submission. Our project is to develop a mobile application for Prime Vice Studio to simplify and accelerate interactions with clients. The PVS Advisor mobile application allows sequential artists to request professional feedback on their projects and learn about turning their passion into anything from a small business to a life-long career in the creative field. All components are run through the database synchronization process between the application and current website data. This back-end architecture is set for the client and administrative processing. It allows clients to upload, receive advice, and maintain contact with their respective advisors. The Flutter Software Development Kit was selected for developing the project. Flutter applications can provide similar performance to native iOS and Android languages, requiring less code to achieve the same outcome. Thus, Flutter is a competitive option with marketing prospects across multiple platforms.

Effortless

Joseph Macdonald

Student's Major: History
Faculty Sponsor: Dr. Kelly Sundberg, English

I wrote "Effortless" to contrast my two grandfathers. Although they grew up in vastly different ways and places, they both showed me what unconditional love should look like. Through the form of a braided essay, I highlight their strengths and weaknesses, and how much they became alike in their later years. For example, their lives began very differently, with one of them emigrating from Greece as a scared young man, and the other who ran from his family through his vices. As time goes on, they both reach a point where they have to change, and they both manage to do so in their own ways. This story is told through looking at their secrets and family anecdotes shared through the course of my life by my relatives that paint a picture of who my grandfathers were as parents. They both accepted the role of family patriarch unwillingly at first, but moved on to be everything their children and grandchildren needed as they moved from adolescence into adulthood. Through the lens of personal narrative, I seek to explore how family, fatherhood, and masculinity informed who they were and who they became.

Whispers of Redemption: An Analysis of Raskolnikov's Metaphysical Resurrection as Portrayed in the Epilogue of *Crime and Punishment*

Lexi Weyer

Student's Major: Political Science & Philosophy
Faculty Sponsor: Dr. Gregory McBrayer, Political Science

Raskolnikov has an abrupt change of heart in the last few pages of the epilogue to *Crime and Punishment*. He suddenly realizes the wrongness of his crime, chooses to love Sonia, and softens his attitude towards Christianity. This ending has long been controversial. Many critics think it is disjointed from the rest of the book, and represents Dostoyevsky's hurried attempt to save his protagonist. However, textual analysis shows consistencies between the epilogue and the preceding novel, thereby demonstrating that such critics are mistaken. Upon close reading, Raskolnikov's conversations with characters like Sonya, Svidrigailov, and Porfiry foreshadow the resolutions in the epilogue through drawing out specific aspects about Raskolnikov's character that are not initially obvious to the reader. This paper argues that the epilogue is firmly rooted in the foundation that Dostoyevsky creates in his novel. In addition to being a natural resolution to the problem of the novel, the epilogue connects to the important elements of Raskolnikov's redemption: love, hope, and faith.

An Exploratory Study of Cultural Contrasts: A Study of Context Levels Among Students Attending a Rural University in Northeast Ohio

Trinity Stout

Student's Major: Social Work

Faculty Sponsor: Dr. Michael Vimont, Social Work

This exploratory/descriptive study focuses on the question of can the theory of cultural contexts be applied at the micro level. This theory was created by an anthropologist by the name of Edward T. Hall in the 1960s, and puts forth that all cultures within the world fit into a specific cultural context-either high-context or low-context-that affects how individuals with that culture experience relationships, view time and spatial boundaries, and how they best communicate. Prior to this study, no real work had been done in attempt to apply the theory of cultural contexts to the micro level, as most previous studies had been done at the macro level and typically in areas related to business. In order to ascertain if the theory of cultural contexts could be applied to the micro level, an instrument that measures cultural contexts was sent out in an electronic survey via email to 3668 students enrolled at Ashland University, a rural university within the United States. This instrument was made up of twenty questions and assigned five out of those twenty questions to four different theoretical dimensions which make up an individual's cultural context, including time, space, relationships, and communication. The study found that each theoretical dimension should be treated as a separate variable rather than a part of the whole, and indicated that low context scores were the most common, but that high context scores were present and varied across theoretical dimensions depending upon the demographic question that they were applied to.

