A Letter from the Dean

Welcome to the eleventh annual College of Arts & Sciences Undergraduate Research and Creative Activity Symposium at Ashland University! This opportunity for students to present their scholarly and creative work has become a signature event in our college. Following the format of a professional conference, students will present original research, perform theatrical and musical selections, read original creative writing, and exhibit their artwork. CAS undergraduate students continue to make original intellectual and creative contributions to their disciplines early in their careers.

Undergraduate research and creative activity mentored by a faculty member, or in collaboration with a faculty member, enhances the educational experiences of our students. Engaged students present research at professional 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 and creative activity demonstrate increased persistence in the pursuit of an undergraduate degree, are more apt to pursue a graduate education, and report greater preparation for carrying out research, acquiring information and speaking effectively.

Faculty and students in the College of Arts & Sciences share a joy of learning that frequently translates into life-long professional relationships. We are delighted to share with you highlights of the outstanding work being conducted by our students in departments across the fine and performing arts, humanities, natural science and social science disciplines. Enjoy the day!

All the best,

Dawn R. Weber, 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 professional 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
Dr. Christopher Chartier, Associate Professor, Psychology
Ms. Megan Connor, Director, University Writing Center
Dr. Hilary Donatini, Associate Professor, English
Dr. Scott Garlock, Professor, Music
Dr. Nicholas Johnson, Assistant Professor, Chemistry
Dr. Wendy Schaller, Associate Professor, Art
Ms. Sara Garska, Administrative Assistant (Program Design & Layout)
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Oral Session I
9:00-10:15 a.m.
Entartete Musik: Jazz and Survival in Nazi Germany
Emily Ebert

Student’s Major: History
Faculty Sponsor: Dr. Gregory McBrayer

Music has always helped humans to express their deepest longings, hopes, and fears; similarly it has regularly served as a form of refuge. After World War I, one particular form of music, jazz, made its way into Europe with the help of musicians such as the Original Dixieland Jazz Band and Lonnie Johnson. Jazz and swing quickly spread across Europe, but the genres saw special appreciation in post-World War I Germany. Berlin was the hub of jazz and culture until Adolf Hitler became chancellor in 1933. Then, Joseph Goebbels, who led the Reichsministerium für Volksaufklärung und Propaganda (Reich Ministry of Public Enlightenment and Propaganda), began working in earnest to eradicate jazz and other Entartete Musik (degenerate music). The bans went into effect in 1935, but the Nazi party nevertheless began to use jazz as a form of propaganda. At the same time, Jews in the Łódź and Warsaw ghettos and prison camps, including Auschwitz and Theresienstadt, played jazz and swing both in public and in private. Indeed, for some, jazz was their salvation. Many musicians, such as Louis Bannet, “The Horn Player of Auschwitz,” survived the war by playing the banned music for the Nazis who imprisoned them but secretly enjoyed their music. This thesis seeks to understand the significance of the underground jazz movement, the apparent contradiction at the heart of the Nazi prohibition of and appreciation for jazz, and the impact that the music had on the prisoners who performed in the camps.
Speak to the Rushing Water: I Am - Reflections in Poems
Paul Dyczkowski

Paul Dyczkowski is a 2013 graduate from Ashland University with Bachelor's degrees in English and Creative Writing, along with a philosophy minor. Upon graduation, after a brief stint on the shipping dock at a window factory, a new opportunity opened up. Paul joined the workforce at one of the nation's oldest private companies, McMaster-Carr Industrial Supply (founded 1901). While focusing on the Maintenance, Repair, and daily Operations (MRO) market, McMaster-Carr also describes itself primarily as a problem-solving, e-commerce, and technology company. Paul started in customer service and now manages customer account information and preferences. He credits Ashland University with nurturing a strong sense of curiosity, humility, and wonder, along with providing him with the skills to draw connections and to seek learning opportunities constantly.

Having been raised by an artist who is also a factory worker, I have been guided into seeing the art behind the machine, into sensing a grander architecture and architect behind the daily rumblings of our lives. After studying English, Creative Writing, and philosophy here at AU, art in general and especially reading and writing remain critical to both my day-to-day life and my career. Now employed by a technology company that prides itself on problem-solving and for supplying makers, thinkers, and repairers with whatever type of hardware they need, poetry remains integral to who I am. Written and verbal communication is imperative where I work, and quickly identifying what type of problem is at hand and fixing it as smoothly as possible is of paramount importance. Reading between the lines and being able to reflect multiple perspectives only helps to choose the best outcome for a given scenario. Having studied what may get hidden or lost in words helps my career, and it also drives my personal life. Rainer Maria Rilke says, “If your daily life seems poor, do not blame it; blame yourself, tell yourself that you are not poet enough to call forth its riches; for to the creator there is no poverty and no poor indifferent place.” I will share a few poems that revolve around my thankfulness and awe in looking at this world that we can constantly change with all the tools at our disposable, tools both physical and otherwise.
Interactive Chaos Automata Website
Branden Barber, Brennen Nalley, Jacob Garry, Kyle Ackert, & Renee Lucas

Students’ Majors: Computer Science (BB, KA, BN, RL), Mathematics & Information Systems (KA), Cyber Security (JG)
Faculty Sponsor: Dr. Deborah Wilson, Computer Science

The Interactive Chaos Automata Website is designed to allow visitors to learn about and manipulate fractals through the use of chaos automata. Users can interact with a specific automaton by inputting their name or a word, which would be used to generate a unique visual pattern called a fractal. During our presentation, we will be presenting the completed website, and demonstrating how chaos automata generate fractals. We will also discuss the source code, methodologies, and technologies used in the creation of the website. Chaos automata are a class of models that are capable of generating fractals by combining finite-state automata with iterated function systems. Finite state automata are composed of a collection of states that are connected by transitions between states. The transitions to take are determined based upon input into the automaton. An iterated function system is used to construct a fractal through the process of iterating more than one transformation equation. Each chaos automaton is made up of a series of states, all interconnected, based on a fixed set of transitions with a single equation of the iterated function system associated with each state. The equations that are used for the iterated function system are called similitudes, which include rotation, x and y displacement, and scaling parameters. These parameters collectively generate a fractal by generating points. Each automaton can be fed a variety of sequences which result in a variety of different fractals from the same automaton.
The (Not So) Good, Bad, and Ugly: Adolescent Alcohol Exposure

Dr. David Werner

Dr. David Werner graduated in 2001 with a double major in biology and chemistry. While at Ashland, he was a member of the Honors Program and completed his thesis under the guidance of Dr. Brian Mohney. David was also a collegiate athlete in swimming throughout his time at Ashland, and was involved in Greek life. Following graduation, he continued onto his graduate studies at the University of Pittsburgh School of Medicine specializing in neuropharmacology, followed by a postdoctoral fellowship at the University of North Carolina School of Medicine. He is currently a tenured associate professor and Director of Graduate Studies for the Department of Psychology and Behavioral Neuroscience at Binghamton University, State University of New York, where his lab focuses on intrinsic and extrinsic developmental factors related to substance use disorders, primarily alcohol.

Despite its widespread societal use, much remains unknown regarding alcohol use and consequences therein, particularly during adolescence when the brain is still undergoing major developmental changes. This presentation will give an overview of our current state of understanding of adolescent alcohol use vulnerability, its relationship to alcohol use disorder later in life, and novel translationally relevant preclinical interventional conduits.
Oral Session II
10:30-11:30 a.m.
Eris Heights: An Analysis of the Search for Truth in a Supernatural-Gothic Screenplay and Trailer
Kellie Pleshinger

Student’s Majors: Creative Writing & Digital Media Production
Faculty Sponsor: Dr. Maura Grady, English

My project is a pilot episode for a supernatural-horror television series, drawing on and inverting Gothic themes. The pilot screenplay Eris Heights follows journalist student Maeve Goddard and officer Billie Rickards in their separate investigations into the death of local teen Calliope Jennings and the monstrous creatures that have awakened in their small-town Eris Heights. Through their investigations to find the truth, the characters explore personal relationships and their own humanity, as well as supernatural elements rooted in Gothic themes and literature. The format of a screenplay allows visual representation as well as literary themes depicted in novels, bringing the characters to life. As the characters investigate, I ask the questions of how far we should go in order to discover the truth and what are the consequences of those discoveries. This oral presentation will include a summary of the screenplay, a viewing of the trailer, and a discussion of the themes presented and the process of writing and filming the screenplay and trailer.
Developing Computer Software to Assist with Financial Decisions

Renee Lucas

Student’s Major: Computer Science
Faculty Sponsor: Dr. Deborah Wilson, Computer Science

Finances can be complicated, especially for the average individual. I have used the programming skills I have developed to create an easy-to-use and understand program to assist a user in making financial decisions. This software features an Investment Calculator that is tailored to assist in determining what Certificate of Deposit (CD) would result in the best financial gain, a Loan Calculator that is useful in calculating how much a borrower must pay at the end of a loan based upon the selected monthly payment, a Split Cost Analysis tool that allows an easy implementation of the 50/20/30 Budget Rule, and a Vehicle affordability tool that can assist in determining the maximum car loan that the user can afford. The creation of this software utilized Visual Basic 2019 and is designed to run on any Windows machine. Data is saved from the program using a combination of a Comma Separated Values File (.csv) and Microsoft Excel exportation features. The Investment Calculator also features the use of a line graph to show the growth of an investment visually. In this presentation the methodologies behind the creation of the software will be discussed, and a demo of the program will be given.
Physical Punishment: Child Abuse or Discipline? A Cross-Cultural Study

Dana Awlia

Student’s Major: Psychology
Faculty Sponsor: Dr. Diane Bonfiglio, Psychology

Culture plays a big role in risk and protective factors regarding mental health for each individual (Sanjeevi et al., 2018). This project examines the way the Saudi and American cultures endorse physically punishing their children as child abuse or discipline, and how it affects adults who have been physically punished as children. 200 participants (100 Saudi, 100 American) took an online survey and were assessed using a modified version of the Parent-Child Conflict Tactics Scale (Straus et al., 1998), the Childhood Experiences of Violence Questionnaire (Walsh et al., 2008), and the Close Relationship Version of the revised Adult Attachment Scale (Collins, 1996). There were no significant differences between 1) Saudi participants ($M = 15.8, SD = 29.5$), and American participants ($M = 20.7, SD = 33.6$) in their endorsement of physical punishment, $t(193) = -1.08, p = .279$, and 2) between Saudi participants ($M = 52.9, SD = 9.5$), and American participants ($M = 54.1, SD = 13.0$) regarding levels of attachment issues, $t(192) = -.729, p = .467$. Additional analyses on the difference between Saudi and American participants regarding their experiences of physical punishment and a correlation between their experiences and attachment issues will be reported in the presentation. This is an important topic in psychology because while there is a lot of research surrounding child abuse and its consequences, there is little of cross-cultural research examining cultural norms and definitions of physical punishment and its impact on people and how they cope with it.
Using Passive Sampling as a Method for the Analysis of Hydrophobic Pesticides and Their Analogs

Cillian Donahue

Student’s Majors: Forensic Biology & Toxicology
Faculty Sponsors: Dr. Jeffrey Weidenhamer, Chemistry, & Dr. Andrew Trimble, Biology/Toxicology

The analysis of trace pesticides and their breakdown products can be difficult and costly. Processing time can be extensive, and large volumes of solvent are required to extract sediments. Simpler methods for pesticide analysis are needed. Passive sampling is based on the idea that various chemical pollutants can accumulate on a collecting device and be quickly extracted with small quantities of solvent for further analysis. The objective of this study was to use probes constructed with silicone passive sampling devices that can be inserted into wet sediments. Then pesticides could be extracted from the probes for detection. Pesticides of interest include those currently in use as well as legacy pesticides which are no longer used but persist in sediment. Analyses were performed using dichlorodiphenyldichloroethylene, known as DDE (a breakdown product of the pesticide DDT) and bifenthrin to evaluate the capabilities of the silicone probes to extract pesticides from sediments. Variables altered in soil based experiments included concentration, time, and temperature. Following a hexane extraction of pesticides from the probes, pesticides were detected using a gas chromatograph equipped with an electron capture detector which is sensitive to halogenated compounds. Results show that the amount of pesticides extracted from sediments increased with pesticide concentration, time the probes were left in the sediment, and temperature. These results will be useful in applying the technique to real world samples.
Oral Session III
10:30-11:30 a.m.
The Effects of PTU Treatment on Zebrafish Embryo Development
Brianna Brdicka

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

Phenylthiourea (PTU) is commonly used in zebrafish research to block melanin production, making developing embryos transparent for observation of internal structures. Published studies have found dosing at 0.2 mM, a typical PTU concentration, results in reduced eye size and impaired thyroid function. Therefore, the goal of our study was to determine if typical PTU usage could alter eye development and expression. Twelve zebrafish zygotes were placed in each PTU concentration (0.15 mM, 0.3 mM, 0.6 mM) and a water control for four days post fertilization (dpf). To determine if the PTU treatments were affecting gene expression, two genes expressed in the thyroid gland (tpo and dio1) and three genes expressed in eye tissue (id3, pitx3, and mafa), as well as the reference gene ef1, were analyzed using quantitative real-time polymerase chain reaction (qRT-PCR). After performing qPCR on one dosing replicate, we found no visible change in expression of any of the five genes. Three replicates of dosing have been successfully completed. We found that hatching time among zygotes in higher concentrations of PTU appeared delayed compared to those in lower PTU concentrations. Eye length in comparison to body length appeared to decrease with increasing PTU concentration. Statistical analyses of these results are in progress. Quantitative-PCR will be performed on the two other dosing replicates, and gene expression at different PTU concentrations will be statistically compared. Our current results suggest that PTU may affect zebrafish zygote physiology but does not appear to alter the expression of our analyzed eye and thyroid related genes.
The Impact of \( \alpha \)-crystallin Loss During Lens Aging
Taylor Kaye

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

Cataracts are the leading cause of blindness worldwide and are typically formed when aging protein aggregates and blocks light passage through the lens. Previous studies show that proteins called \( \alpha \)-crystallins inhibit protein aggregation and slow cataract formation. However, the specific role of different \( \alpha \)-crystallins is not known. Our lab has engineered zebrafish that lack each of the three different \( \alpha \)-crystallin proteins. In this study we examined lenses from these fish as they age to determine the impact of losing each \( \alpha \)-crystallin on lens clarity, size and resistance to temperature-induced cataract formation.

Two gene knockout lines of zebrafish were used in this study lacking either \( \alpha \)Ba-crystallin or \( \alpha \)Bb-crystallin protein. Fish from each strain were anesthetized and euthanized at 6, 12, 18 and 24 months of age and their lenses removed. Microscopy was used to assess lens clarity and measure diameter. Cataract formation was mimicked by heating the lenses and the extent of protein aggregation was quantified using a microplate reader. A linear increase in lens protein aggregation was observed at temperatures from 45 to 60 °C, and 52.5 °C was chosen for the study. The diameter of wildtype and knockout zebrafish lenses relative to standard body length were compared. At six months \( \alpha \)Bb-crystallin knockout fish had statistically significantly smaller lenses than wildtype fish, but \( \alpha \)Ba-crystallin knockout lenses were not different. Thermal aggregation assays and lens assessment at all time points are currently in process. These findings will help to detail the possibly divergent roles of different \( \alpha \)-crystallins in preventing lens cataracts.
AUWQua
Nick Yeley, Nathan McVicar, Kyle D’Ambrosio, & Jaret Martin

Students’ Major: Computer Science
Faculty Sponsor: Dr. Deborah Wilson, Computer Science

Team AUWQua has been commissioned to redesign the Ashland University Water Quality website. The intention of this project is to redesign the website while still keeping the general structure and purpose of the website the same as it is. This new design will make the website eye-popping and more attractive. Through the implementation of Google Suite we are able to make file upload/download and file displaying seamless processes with little to no computer intuition required by uploading the file to Google Drive and then using a GUI function on Google Sites to add that Google Drive file directly to the web page. This website will not only serve as a resource for people to check the current water quality, but also as a resource for expanding public knowledge of biology and ecology as it pertains to the Ashland area and the wildlife preserves surrounding it such as the Black Fork Wetlands and the Lang Creek Basin. The presentation will include an initial slide show describing our process and goal, followed by a presentation of the live website where we will demonstrate the features mentioned in the slide show.
Mary & #MeToo: Exploring Consent & Female Agency in the Gospel of Luke
Marquell Gorsuch

Student’s Major: Religion
Faculty Sponsor: Dr. David Aune, Religion

My research project delineates through a feminist hermeneutic how Mary the mother of Jesus is described in the Gospel of Luke, and applies a feminist theological lens to the Marian dogmas of the Catholic Church. I utilized the writings of various theologians to suggest that a feminist understanding of Mary can help inform and enhance the faith of Christians the world over. Feminism and Roman Catholicism have often been pitted against each other, but through my research I hope to reconcile the two. Through a feminist biblical hermeneutic I analyzed the infancy narrative in the first and second chapters of the Gospel of Luke, as well as applying a feminist theological lens to the Catholic dogmas of the Immaculate Conception and the Perpetual Virginity. The primary focus of my research was on the Annunciation (the announcement to Mary by the Archangel Gabriel that she would conceive and give birth to Jesus) and how this story can inform discourse on the issue of consent, and the Church’s interaction with the #MeToo movement. The conclusion of my research found that Mary’s consent was necessary for the Incarnation to take place and that she demonstrates a great deal of agency and independence in Luke’s narrative.
Poster/Exhibition Session I
11:45-12:45 p.m.
America’s First Feminist or Just a Prototypical Republican Mother and Patriot? The Conundrum of Abigail Adams

Erin Groves

Student’s Major: Criminal Justice
Faculty Sponsor: Dr. Cara Rogers, History

During the era of the American founding, women did not have many rights. Abigail Adams is remembered as a revolutionary advocate for women’s rights, as well as for her marriage to John Adams. She influenced his life and decisions, writing frequent letters which often included obscure literary quotations as part of an ongoing quest to test one another’s knowledge. My presentation will examine the famous letter of March 1776 in which Abigail urges John to “remember the ladies.” She continues by saying “that your Sex are Naturally Tyrannical is a Truth so thoroughly established as to admit of no dispute, but such of you as wish to be happy willingly give up the harsh title of Master for the more tender and endearing one of Friend.” Scholars have used this letter as evidence for Abigail’s feminist agenda; however, the line is not originally Abigail’s. She took it from the novel *The History of Emily Montague* by Frances Brooke. This information about the true origin of the line raises new questions about Abigail’s intentions when she wrote this letter: did she fully agree with Brooke’s assertion, or was Abigail using a literary reference to draw John’s attention to this argument? It is my assertion that knowing Abigail was quoting Frances Brooke helps explain why this letter contains such striking language. Abigail Adams did not believe men were tyrants over their wives – she was simply using a radical perspective to prove her point to her husband.
Blackfork Wetlands Nature Preserve
Mobile Android Application
Marshall Ney, Ian Johnson, Sterling Armstrong, & Nathaniel Redden

Students’ Major: Computer Science
Faculty Sponsor: Dr. Deborah Wilson, Computer Science

Ashland University is home to several flourishing nature preserves. Within these nature preserves lives a variety of species of plants, animals, and insects that are unknown to many visitors. Our team has created a mobile Android application that will offer an easy-to-use interface for users who wish to find out more information about the inhabitants of these preserves. Our application will be focused on the Blackfork Wetlands Nature Preserve and the living organisms within it. The application we created will offer an organized layout of the textual and photographic data related to these species, as well as offer links to further external sources, should users wish to seek further information. Additionally, a GPS feature will be integrated. This will allow for user location-tracking when within the perimeter of the preserve, as well as a search feature which will allow users to limit parameters on the species they are trying to locate to discover the name and other relevant metadata tied to the given organism. This application will be of great use to the AU Biology Department, with whom we will be working closely on the development of this application, as well as anyone from the general public who is either visiting the preserve or simply wishes to know more about what exists within each preserve. The creation and use of our application will simplify and enhance the user experience for those interested in the AU nature preserves.
The Eagle Way: The Path Taken through History for Ashland University Athletics

Zach Read

Student’s Majors: Digital Media Journalism & Digital Media Production
Faculty Sponsor: Dr. David McCoy, Journalism & Digital Media

Ashland University has a rich history of athletics which dates back to 1920 when they officially started at what was then Ashland College. To capture this unique history, I have composed a video documentary that depicts a journey through the 100 years of Ashland University athletics. Through deep historical research, the documentary uncovers stories and memories that have been hidden for decades. It will address how the mascot of the eagle became the Eagles, why different athletic teams started around campus, stellar athletes who have made their mark at Ashland, and many other stories that impacted the athletic program. This documentary also displays the process of crafting a creative piece by showcasing video and editing skills, as well as audio, storytelling and other post production skills. A number of former coaches, administrators and athletes will tell their story of their time at Ashland, and how they will always remember what has made Ashland University athletics so successful.
Soil Degradation Dynamics of Thiophenes Released by Marigold Roots
Maykahla Gain, Zoe Shellenbarger, & Abigail Dingus

Students’ Majors: Biology & Toxicology (MG, ZS), Biology & Biochemistry (AD)
Faculty Sponsor: Dr. Jeffrey Weidenhamer, Chemistry

Thiophenes are naturally occurring, biologically active compounds released from marigold roots. Alpha-terthienyl (alpha-T) and 5-(3-buten-1-ynyl)-2,2’-bithienyl (BBT) are natural pesticides that protect marigolds from nematodes, some insects, and plant pathogens. Though highly beneficial, the degradation of these compounds in soil has not been studied. The objective of this study was to determine the persistence of thiophenes under different soil conditions. To analyze the microbial role in degradation, soil from marigold beds was sterilized to remove microbes while another portion of soil remained nonsterile. Alpha-T is commercially available, while BBT was isolated from marigold extracts. In two separate experiments, BBT and alpha-T were added to sterile and nonsterile soil at three different concentrations: 1, 5, 10 micrograms per gram soil, rates known to be comparable to actual thiophene levels under marigolds. The soil was extracted at ten weekly time points and analyzed using high performance liquid chromatography (HPLC) with fluorescence detection. Alpha-T was found to have a half-life of 4.65 weeks in sterile soil and 3.02 weeks in nonsterile soil. The study of BBT degradation is in progress. Preliminary studies suggest that BBT will breakdown similarly to Alpha-T. We predict that BBT, like alpha-T, will degrade at a faster rate in nonsterile soil due to the microbial interaction and will have a half-life of several weeks in both sterile and nonsterile soil. Understanding thiophene degradation may cast light on how these compounds help the invasive plant fetid dogweed (*Dyssodia papposa*), which also produces these thiophenes, spread into new plant communities.
Using Silicone Wristbands to Track Chemical Exposure
Megan Alfieri

Student’s Major: Forensic Chemistry
Faculty Sponsors: Dr. Brian Mohney & Dr. Jeffrey Weidenhamer, Chemistry

Simple, lightweight silicone bands in the form of bracelets can provide a new tool for tracking everyday chemical exposure to nonpolar environmental chemicals because these silicone polymers have a high affinity for nonpolar molecules. Once absorbed into the bands, the molecules can be extracted and analyzed to provide a snapshot of an individual’s chemical exposure over a period of time. This project focused on the use of silicone wristbands to measure (a) exposure to sunscreen components in multiple environments, and (b) exposure to polynuclear aromatic hydrocarbons (PAHs) from burning materials. Wristbands were analyzed by high performance liquid chromatography with fluorescence detection and gas chromatography with mass spectroscopy detection. Sunscreen levels were measured in water samples, in sand samples, on wristbands worn by participants, and wristbands left in swimming pool skimmer-baskets. Wristbands from all exposure settings show the presence of five common sunscreen compounds. Octocrylene was detected on bands in a range of 400-2000 μg and homosalate was detected at 480-4400 μg. To measure PAH exposure in smoke from fires, wristbands were exposed to controlled burns of known materials. Wristbands that were exposed to burning materials showed the presence of eight different PAHs. Two PAHs were detected at high concentrations; naphthalene at 0.386-1.00 μg and benzo[k]fluoranthene at 0.260-1.53 μg. Silicone bands prove to be an effective method of monitoring exposure to common nonpolar organic chemicals in the environment.
Probing the Root Exudation of Harmala Alkaloids from Syrian Rue
Emily Vitek

Student’s Major: Forensic Biology
Faculty Sponsors: Dr. Brian Mohney & Dr. Jeffrey Weidenhamer, Chemistry

Syrian rue (Peganum harmala), a plant native to the Middle East and southern Asia, has a history of use in rituals and folk medicine. Since its 1930 introduction in the US it has invaded deserts of the southwest. Syrian rue produces six harmala alkaloids that can inhibit growth of neighboring plants and negatively impact organisms living near its roots. To better understand the toxicity of these compounds in soil, alkaloids were measured using silicone tube micro-extraction - a technique that allows for repeated sampling of the soil without disturbance. Silicone sequesters lipophilic organic compounds, such as the harmala alkaloids. Compounds are extracted from the silicone and concentrations measured using high performance liquid chromatography (HPLC). Harmine and harmaline can be detected by fluorescence detection at 10 and 1 ng/mL, respectively. Spatial and temporal profiles of the presence of harmala alkaloids in the root zone were measured using various planting methods and silicone probe designs including silicone sheets. Sheets show the spatial root profile of harmine ranging from 0.1-37.3 ng. Other types of probes detect quantities of 1-20 ng of harmine in localized regions of the root zone. Harmaline and harmine inhibit or delay seed germination and affect the growth of desert and plain grasses. Blue grama root growth is inhibited by both of these alkaloids; effects are seen at 20 μg/ml harmaline and 100 μg/ml harmine. Plant shoot length is affected by harmaline only. Understanding the dynamics and toxicity of alkaloid release will provide insight into the mechanism for the invasive success of Syrian rue.
The Synthesis and Study of Four-, Six-, and Eight-Armed Calixarene Polylactide/Polyethylene Glycol Star Block Copolymers  
Carrie Bearshak, Alexandria Greer, & Taylor Kroll  

Students’ Majors: Biochemistry (CB, AG), Biochemistry, Environmental Science, & Toxicology (TK)  
Faculty Sponsor: Dr. Perry Corbin, Chemistry  

The synthesis and study of star-shaped polymers is of significant interest because of the potential of such polymers to have differing properties compared to their linear counterparts. Star polymers have a central molecular core that is surrounded by three or more polymer chains (arms). The synthesis of star polymers can be difficult. Thus, the further development of methods for preparing them is important. In this presentation, efforts to synthesize new six-armed calixarene-core polylactide/polyethylene glycol (PLA-PEG) star block copolymers will be described and compared to our research group’s earlier synthesis of four- and eight-armed calixarene-core PLA-PEG copolymers. Specifically, six-armed calixarene-core PLA-PEG star block copolymers have been synthesized in several steps. First, six-armed PLA star polymers were prepared using an appropriate calix-6-arene initiator in a Sn(II)-catalyzed ring-opening polymerization of lactide. Subsequent incorporation of alkyne functional groups at the end groups of the star PLA chains provided a handle for attaching PEG blocks using a copper-catalyzed click reaction. No-deuterium (No-D) NMR spectroscopy is being used to successfully follow and optimize this challenging polymer coupling. Due to their amphiphilic character and unique architecture, the star block copolymers are expected to form large aggregates (micelles) in water at lower concentrations than their linear counterparts, so they have potential for use in drug-delivery applications. The unique structure and shape of the calixarene-core also lends itself for further derivatization such as the attachment of drug molecules.
Development of Life-Science Kits for Educational Outreach
Nicholas Klingbeil

Student’s Majors: Environmental Science & Biology
Faculty Sponsor: Dr. Dolly Crawford, Biology & Toxicology

Many teachers and schools have sought to keep their students engaged and excited about science. Educational outreach and the use of pedagogical kits is one method utilized to realize these educational goals. This project consisted of constructing pedagogical kits using mammal and bird specimens in the Ashland University teaching collection to facilitate educational programs in the Ashland City School District. These kits contained a lesson plan to guide the educator, animal voucher material (labeled animal specimens) appropriate for discussions of different adaptations, and applied student activities to reinforce concepts. The content and activities were modified to be appropriate for students in grades four through seven, and undergraduate students conducted educational outreach to these grade levels using the kits. Skins and skeletons in the collection were prepared using standard taxidermy procedures and were identified, labeled and organized taxonomically. Drawers in the archival cabinet were installed, and the vouchers were added according to current taxonomic classification. Each voucher record was also added to a database. The organized collection increased the ease of use among faculty, students and laboratory staff in biology classrooms, and also created an opportunity to use the material in educational outreach kits. A lesson plan on animal adaptations was developed for the inaugural launch of the outreach program. The effectiveness of the kits was evaluated using pre- and post-surveys. With the initial conception of these educational kits, further kits can be created in order to continue and maintain the importance of science education outreach directed towards young students.
The Importance of Post-Care Physician Surveys and the Relationship to Host Site
Josie Giordano, Alec Mueller, Sophia Lowe, Calandra Moore, Rainnell Vernon, & Heather Maltbie

Students’ Majors: Health & Risk Communication (JG, CM), Business (AM), Online Teaching & Educational Technology (SL), Public Relations & Strategic Communication (CM), Religion (RV), Nursing (HM)
Faculty Sponsor: Dr. Gwen Hullman, Communication Studies

Patients visit multiple doctor review websites to find a new healthcare provider. The value of ratings typically lies in the recurring themes present across multiple raters, as opposed to uncorroborated outlying reviews or a very low number of reviews. Additionally, reviews and rating tools can be sponsored by different organizations, such as a third-party review site or the doctor’s health care affiliation organization’s website. The present study compares 100 employer-sponsored website ratings and reviews to third party ratings and reviews of the same physicians for consistency, number of raters/reviewers, and the presence of recurring themes in the reviews (physician competence, office staff, wait time, office cleanliness). Data are subjected to t-test analysis and thematic analysis.
Ghosts of Myself: Coping with Anxiety Through Creative Expression
Alexandria Hamilton

Student’s Major: Fine Arts
Faculty Sponsor: Prof. Keith Dull, Art

Anxiety acts as a roadblock that keeps the mind from being free to think and act normally. I suffer from anxiety as a result of being diagnosed with leukemia as a teenager, and I have sought to find peace with my diagnosis through artistic expression. I have lived in fear because of experiences during chemotherapy, and this has held me back from pursuing my aspirations. It was not until I explored these feelings through painting and printmaking that I finally gained the confidence to move beyond my diagnosis. The struggle to find harmony between two mediums has helped me find balance with the fear I constantly feel. I find inspiration in nature to combat the negative feelings I associate with sterile environments like hospitals. Succulents in small pots are delicate and restricted, but in their true environment they are hearty and bountiful; this is also true of the life I lived during chemotherapy and is representative of feeling confined due to anxiety and self-doubt. Psychology of color also inspires my work and allows me to express complex emotions felt during my time in the hospital; such as fear, depression and, anger but, also joy. I want my work to be relatable to anyone who has experienced anxiety in their lifetime, which is why I chose succulents and color as symbols rather than hospital imagery. I want the viewer to reflect on my artwork with their own experiences and let go of the idea that people suffer alone in this world.
Poster/Exhibition Session II
12:45-1:45 p.m.
Groupthink: A Gateway into the Psyche of a Terrorist Organization
Shelby Starnes

Student’s Majors: International Political Studies & Political Science
Faculty Sponsors: Dr. Mark Rubin, Criminal Justice

Since the beginning of civilization, the world has endured the tumultuous exploits of various terrorist organizations. As time marched onward, the tactics and strategies used by terrorist organizations (Al Qaeda, ISIS, etc.) evolved due to advancements in technology, mainstream, social, and mass media, as well as dissatisfaction amongst disenfranchised members of social, political, and religious groups. With the threat of terrorism consistently growing, law enforcement and intelligence agencies are toiling to find innovative avenues to penetrate the shell that surrounds these organizations. Since 2014, the terrorist group ISIS has made waves on the international stage for their consistent progression through the Middle East and steady success with recruitment into their organization. The cornerstone of groups (like ISIS) that gives crucial insight to how and why they operate is the concept of groupthink. Groupthink is a psychological phenomenon that attempts to explain why seemingly rational individuals end up acting irrationally in a radicalized group setting. By using open source intelligence sources to study ISIS and their group activities, it can be deduced that this organization thrives on the negative impacts (i.e. fear, radicalized religion) that stem from groupthink. By utilizing fear and intimidation tactics, rational opinions are stifled, members are stripped of their identity, and old principals are replaced with a new identity to embody. Through this process, radicalized religion, and training camps, groupthink steadily takes hold of unsuspecting individuals, and terrorist organizations expect total obedience as a result.
Investigating Object Orientation Effects Across 14 Languages
Brianna Jurosic & Brynna Leach

Students’ Majors: Psychology (BJ, BL), Criminal Justice (BJ)
Faculty Sponsors: Dr. Christopher Chartier, Psychology

This study is focused on the mental simulation theories of language comprehension, which propose that people create mental representations of real objects automatically when reading the name of the object, referred to as the object-orientation effect. When a participant is exposed to a single word and is then asked to visualize a related image, the participant will visualize the physical orientation of the image based on the word that was presented. For example, one may read the word ‘wall’, followed by ‘nail’ and visualize a nail oriented horizontally as if the nail was hammered into the wall. Participants completed a sentence-picture task and a picture-picture task. The sentence-picture task consisted of reading a sentence, followed by viewing a picture (vase, nail, hammer, etc.). Participants responded by indicating whether or not the pictured object was mentioned in the sentence. The picture-picture task was a mental rotation task where participants verified whether two pictures were identical. We are collecting data at Ashland, in addition to coordinating global data collection through the Psychological Science Accelerator (PSA). The PSA is an international, multi-lab system that specializes in the replication of psychological studies. Each laboratory replicates the same study in their own location. These individual data sets are then aggregated and used for a single meta-analysis of overarching study. By April, we will gather 3,533 participants globally and 100 participants in Ashland. At the time of this submission, we have gathered 2,224 participants globally and 68 participants in Ashland.
To Which World Regions Does the Valence-Dominance Model of Social Perception Apply?
Savannah Lewis

Student’s Major: Psychology
Faculty sponsor: Dr. Christopher Chartier, Psychology

This study attempts to replicate Oosterhof and Todorov’s (2008) influential Valence-Dominance model of social perception. Oosterhof and Todorov had participants rate many faces on one of thirteen traits commonly used in person perception research (e.g., meanness, caringness, intelligence). Using Exploratory factor analysis (EFA), they found that two overarching dimensions, Valence (intention to harm) and Dominance (ability to harm), drive social judgments on these traits. The current study replicated these methods in a large, diverse sample (N = 11,481 participants from 41 countries). We conducted an EFA and tucker’s coefficient of congruence was to simulate the original analysis strategy used by Oosterhof and Todorov. The results of the tucker’s analysis suggest that the first component [strongly correlated with trustworthiness (r = .94), and weakly correlated with dominance (r = -.24)] was congruent with the original study’s first component in most world regions (with the exception of Eastern Europe and the Middle East) (ϕ > .95). The second component [strongly correlated with trustworthiness (r = .94), and weakly correlated with dominance (r = -.24)] was congruent with the original study’s second component in all world regions (ϕ > .85), except Asia (ϕ = .848). This study was the first conducted by the Psychological Science Accelerator (PSA) and represents the largest test of the Valence-Dominance model. It also involved the largest data set in the history of face perception research and involved more participating institutions than any collaborative study in the history of psychological science. Logistical challenges for such collaborative projects will be discussed.
Healthcare and Feminism: Progress within Peruvian Indigenous Communities

Tyler Easton & Angelica Malkus

Students’ Majors: International Business (TE), Nursing (AM), Spanish (TE, AM)
Faculty Sponsor: Dr. Jennifer Rathbun, Spanish

When the Spanish conquistadors invaded Peru in 1532, they successfully took over many indigenous communities. However, they did not eradicate the culture, traditions, and languages that are a part of Peru’s current culture. With 51 indigenous groups in Peru making up around 45% of the population, the indigenous influence is extremely prominent. This presentation highlights the issues of healthcare inequality and violence against women in the indigenous communities of Peru. With numerous tribes abiding in rural areas far from cities and resources such as hospitals, the Peruvian government struggles to provide adequate healthcare in these sectors. This challenge is evident in the cases of mass food poisoning of the Shimabenzo community, scarcity of essential medical equipment, and absence of neonatal and maternal care specialists. Additionally, Peru currently faces a grave dilemma: femicides. These acts of murder of women have critically stricken the country and negatively affected the indigenous community. Indigenous women in Peru are exceedingly susceptible to abuse, sexual exploitation, forced migration, cultural uprooting, and discrimination. Medical researchers, doctors, leading Peruvian women, filmmakers, and news stations are responding to these issues that indigenous peoples face every day by creating change one influential action at a time. This presentation will be in Spanish with an English outline provided for the audience.
Investigation of the Incorporation of Lipophilic Cations onto Phosphazene-Based Drug Delivery Systems
Shelby Reutter

Student’s Majors: Biology, Toxicology, & Environmental Science
Faculty Sponsor: Dr. Nicholas Johnson, Chemistry

A major challenge with pharmaceuticals is delivery. Many drugs that display high activity are fat-soluble; however, to deliver these molecules, they must also be water-soluble. One method to increase the water solubility of pharmaceuticals is through the attachment of these molecules to other novel water-soluble molecular units that serve as temporary transport vehicles. Cyclophosphazenes are a model system for this transport for several reasons, one being the ease at which the phosphorus atoms of the ring structure can be substituted with a wide variety of side groups. We have synthesized a water-soluble phosphazene-based system by substituting three equivalents of tetraethyleneglycol monomethyl ether (TEGME) onto the phosphazene trimer ring. Following the addition of three equivalents of TEGME, the phosphazene ring system contains additional sites for further modification and substitution. These sites can be further substituted with imaging agents, anti-cancer agents, and targeting moieties. We are currently investigating the efficacy of substituting targeting moieties (triphenylphosphonium cations) to the previously synthesized phosphazene system. Triphenylphosphonium-based compounds have demonstrated effectiveness in targeting mitochondria in cancer cells. The mitochondria is the powerhouse of the cell and these cations are attracted to it. By substituting triphenylphosphonium cations to the cyclophosphazene system, the efficacy of the compound may increase while also decreasing toxicity.
Imidazole Derivatives as Potential Anti-Cancer Agents
Evan Thomae

Student’s Major: Biochemistry
Faculty Sponsor: Dr. Nicholas Johnson, Chemistry

Imidazoles have recently garnered much attention because many of their derivatives have shown to be effective anti-cancer and anti-microbial agents. Imidazoles are composed of a five-membered ring containing carbon and nitrogen, and are soluble and ionizable. Imidazoles can also be substituted based on the ligands that they possess. These properties bring about many derivatives that vary in anti-cancer and anti-microbial activity; however, the more active the derivative is the less soluble it becomes. The lack of solubility can be circumvented through the use of oligomeric phosphazene rings, specifically hexachlorophosphazene trimer ([PCl₂N]₃), as a drug delivery system. Phosphazenes possess many properties that make them highly attractive candidates for drug delivery applications. Phosphazene rings are inexpensive and easy synthetic targets and the ease of substitution of phosphazene ring structure make them highly versatile and tunable. Tetraethyleneglycol monomethyl ether (TEGME) can be substituted onto the cyclophosphazene increasing the hydrophilicity of the ring system, while still leaving sites for further modification. These other sites can be substituted with highly lipophilic drugs, such as the aforementioned imidazoles. An imidazole that our group has been focusing on is monomethylnapthyl-2-propanolbenzimidazole. This imidazole has an alcohol functional group present making attachment to the aforementioned phosphazene ring easier. This imidazole that we have synthesized is not as large as many other highly active imidazole compounds allowing for multiple equivalents to be substituted onto the drug delivery system. Results from this work have been characterized via nuclear magnetic resonance (NMR) spectroscopy.
Comparing the Insect Diversity of Both the Black Fork Wetlands and Stoffer Preserves
Kimberley Gault

Student’s Majors: Environmental Science & Biology
Faculty Sponsor: Prof. Merrill Tawse, Biology

The Black Fork Wetlands Preserve and Stoffer Preserve are two prominent Ashland University preserves that were selected for the overall objective of their biodiversity of insects. The Black Fork Wetlands Preserve is a site consisting of wetlands, prairie, and a semi-wooded area, whereas Stoffer Preserve is a more mid-successional field that is transitioning from primarily grasses to one that contains some woody shrubs. Based on these ecological differences, it was hypothesized that the Black Fork Wetlands Preserve would result in greater insect diversity. A total of 28 different insect species were captured by hand, or through the utilization of insect nets and aquatic nets, from August until October 2019. Insects were preserved until identification and pinning or further preservation could be completed. Capture rates were calculated for the Black Fork Wetlands and Stoffer Preserves that resulted in 3.40 and 3.28 insects captured within an 8-hour time span per site, respectively. Future research would assist in the Department’s biological inventory of Ashland University’s various preserves where collections can be used in biology courses to include entomology.
Getting Them on Their Own: Methods of Bacteriophage Isolation for Broadening Host Range
Jessica Myers, Megan Lollo, & Joshua Davis

Students’ Majors: Biology (JM, ML, JD), Toxicology (ML)
Faculty Sponsor: Dr. Paul Hyman, Biology

Bacteriophages are viruses that infect bacteria. They are found in different environments, including soil, which was the bacteriophage source utilized for this research on bacteriophage host range. Host range is a characteristic of viruses that describes which cells the virus is capable of infecting. Knowing which bacteria are infected by which bacteriophages facilitates a greater understanding of the microbial ecology of soil. Additionally, the isolation and host range characterization of bacteriophages can be useful in the practice of phage therapy, using bacteriophages to treat bacterial infections. Our hypothesis asked whether adding a specific host to the isolation sample would produce bacteriophages with a broader host range than isolation relying on bacteria already in the same soil sample to initially grow the bacteriophages. Bacteriophages were isolated from several soil samples found in a variety of locations. Some samples were inoculated with Bacillus cereus 6A3 bacteria, while others were left uninoculated. Bacteriophages were isolated from these samples, and, through procedures of passaging and amplification, stocks of phage were obtained. From these stocks, host range was determined. There did not seem to be a distinct difference in the host range pattern between the samples with bacteria and the samples without. Throughout both of these, there was a mixture of broader and narrower host ranges.
For as long as I can remember, I have always had an interest in cartoons. Whenever I turned on the TV as a kid, or popped in a video game, I was strongly drawn to some form of animation. These experiences produced a deep admiration for the interesting character designs and the time and work that goes into telling a simple story in an entertaining way. My project focuses on the elements of creating a video game called Grandpa’s Attic. My design includes short animations, a bit of sprite work, and character designs for the gameplay. The inspiration is collected from a variety of animated cartoons and video games. The styles range from the rubber hose cartoons from the 1920s, to 8-bit games, to modern animation in film and television, and even beautifully designed platform games. My goal is to tell an interesting story through the creation of original characters, while also creating a memorable and engaging experience that people will find not only enjoyable, but will also appreciate aesthetically.
Oral Session IV
2:00-3:15 p.m.
Visual Attention Differences among Video-Game Players
Savannah Lewis, Miranda Bielawski, Natalie Clinger, & Hannah Outen

Students’ Majors: Psychology (SL, MB, NC, HO), Criminal Justice (HO)
Faculty Sponsors: Dr. Peter Mallik & Dr. Mitchell Metzger, Psychology

There are inconsistencies in the research surrounding video-game experience on cognitive tasks. It has been demonstrated that individuals who are video game players outperform non-video game players (Bediou et al., 2018); however, this effect is not always observed (Mack et al., 2016). Based on their self-report video-game experience, seventy-four participants were divided into three groups and then completed visual attention tasks. A mixed 3 (Gamer Group) x 4 (Distractor Count) (5,10,15,20 items on screen) ANOVA was conducted for the visual search task for response time (RT) and accuracy. For RT, there was a significant between-subjects effect for gamer group $F_{(2, 69)} = 6.376, p=0.003$. Non-gamer and moderate gamer’s RT were significantly lower than heavy gamers (over 10 hours a week). There was a main effect for distractor count $F_{(3, 69)} = 37.790, p<0.001$. RT increased with distractor count. For RT, there was no significant interaction between gamer group and distractor count $F_{(6,207)} = 0.166, p=0.958$. For the Posner cueing task (Probe and target on the same side for congruent and different sides for incongruent), an ANOVA showed that the heavy gamer group had faster RT (indicating a smaller cueing effect) than the other groups $F_{(2, 72)} = 3.306, p=0.042$. The data indicate that there is a relationship between visual cognition and “heavy” videogame playing as opposed to non-gaming or moderate gaming. This has demonstrated that not all aspects of visual cognition are differentially related to video-game involvement.
“Chasing May”: A Look at Small Town Life Through a Creative Lens
Sara Ludwig

Student’s Major: Creative Writing
Faculty Sponsor: Dr. Maura Grady, English

My fictional short story “Chasing May” explores themes such as gentrification, class divide, feelings of hopelessness, wanderlust, and interpersonal relationships. In this story the protagonist, May Higgins, lives in a mobile home park in Nebraska with her mother and three siblings. When she learns that the land the mobile home park resides on is being bought by a corporation, May begins to uncover the truth about her town, family, and ultimately how she views herself in relation to her circumstances. In the beginning of her arc she desperately wants to leave the town she reluctantly calls home, but her desire shifts from that of departure to one of determination to stay and fight, ending with uneasy acceptance. This presentation will include a reading from the story, as well as background research that went into making it as realistic as possible.
Optimal Strategies while Playing the Big Wheel on “The Price is Right”

Kyle Ackert

Student’s Majors: Computer Science, Mathematics, & Management Information Systems
Faculty Sponsor: Dr. Christopher Swanson, Mathematics

A contestant on “The Price is Right” plays the Big Wheel game against 2 other contestants to get into the showcase round. For this game, there are 20 spaces on the wheel labeled \{5,10,15,...,95,100\}. The first contestant spins the wheel to get their initial amount. The contestant can then either stay if they like the amount or spin again if they feel like they are going to lose to one of the other contestants. After this, the second player will spin their first spin. If they are lower than player one, they will definitely spin again, but if they are higher, they need to decide if they want to spin again. This process is repeated again for the third contestant. If they are lower than either contestant one or two, they would spin again, but if they are higher than both contestants, they will not spin again because they would have already won. Each contestant only gets a maximum of two spins, and if the contestant goes over 100, they are eliminated immediately. In this presentation, I will analyze a similar two player game and calculate the probabilities that each player wins along with the strategies they need to use to give them the best chances of winning. I will also show why player one has a best strategy of spinning again after their first spin if they get less than 55. This is an interesting project as it shows how mathematics can be used to solve everyday problems and identify the best possible strategies for playing games.
Hubbub: A Carpool Organizing App for Commuter Students  
Branden Barber  

Student’s Major: Computer Science  
Faculty Sponsor: Dr. Deborah Wilson, Computer Science  

Hubbub is an Android application that seeks to provide Ashland University commuter students the means to both better organize carpooling and to create a greater sense of community. The main feature of the application is that there will be several hotspots on a map that act as common meeting places for those wanting to carpool, but not give away their home addresses. If the user allows the app to see their location it will select the nearest hotspot to them. Once the user has connected to a hotspot, they will be able to connect to other commuter students near this hotspot to organize ride sharing. The user will also be able to add people as friends, blacklist them, or chat with them. Lastly the application will feature customizable profiles for users that will introduce and differentiate them from other users.
Pseudocode Pscrutinizer
Jonathan Meredith, Camryn Bickerstaff, Kurtis Yoder, Josiah Moore, & Ryan Hale

Students’ Majors: Computer Science (JM, CB, KY, JM, RH), Mathematics (CB), Business Administration (KY)
Faculty Sponsor: Dr. Deborah Wilson, Computer Science

We have created a program called the Pseudocode Pscrutinizer, which takes pseudocode, runs it, and allows students to see what is happening in memory. The purpose of the Pseudocode Pscrutinizer is to help students of the Computer Science 101: Logic and Computing course learn how to read and write pseudocode. Since the pseudocode “language” has many different variations and forms, the program will specifically work with the same form of pseudocode that is used in the textbook for the CS 101 course. By making this design decision, the keywords and phrases used in the program will correspond to what is shown in the textbook in order to ease learning. The goal for this project is to allow students to come up with solutions to problems in a way that more closely matches English than typical programming languages. This will help students to switch their mindsets to think like a programmer, one of the most difficult hurdles to get over when learning to program. The editor will be able to work with the basic data types (Integer, Real, String Boolean), variables, constants, modules, if statements, case structures, loops, functions (including built-in functions for random numbers, functions for working with strings, etc.), and arrays. The editor will run in a web browser and will have a component for writing the pseudocode (the text editor), a console for input and output when the pseudocode is executed, and will have a variable view component, so the students can see what is happening in memory.
Oral Session V
2:00-3:15 p.m.
Developing a Web Application for the Sustainability Club
Kyle Hall, Benjamin Schlemmer, Phillip Waller, & Eric Watts

Students’ Majors: Computer Science (KH, BS, PW, EW), Music (EW)
Faculty Sponsor: Dr. Deborah Wilson, Computer Science

Despite the many web services that are available to organizations to give them an internet presence, one of the most effective ways to represent an activity group is through a personalized website. We have developed a web page to meet the needs of the Sustainability Club at Ashland University. Such an application is important to the future of our planet and campus to encourage activities in sustainability such as recycling and reducing our carbon footprint. This application was developed primarily using HTML, CSS, and JavaScript, as well as other packages and Application Programming Interfaces (APIs). The website offers many interactive features for those wanting to learn more about sustainability, including an information page on sustainability and recycling, a news page on which members of the sustainability club can update the page and add posts, a carbon footprint calculator for any college campus, and an interactive map displaying where and what items can be recycled on the AU campus. For this presentation, we will be showcasing all of these features of the website, as well as discussing our implementation and design process.
Pycket: A Python Based Ticketing and Support System
Aaron Bradfield, Trevor Shymske, Eric Jordan, & Qingzhong Xu

Students’ Major: Computer Science
Faculty Sponsor: Dr. Deborah Wilson, Computer Science

Enterprise grade ticketing and support systems are the backbone of a strong customer service experience in companies, universities, and government agencies around the globe. Ticketing and support systems provide the tools and software to manage many hundreds or thousands of different computer machines along with the relevant ticketing software to support any issues users may come across. But what happens if you are a small to medium sized business? Open source alternatives such as osTicket exist but are often more trouble to setup than they are worth with lengthy configuration processes and extreme complexity. Pycket hopes to alleviate these issues. Pycket is a Python based ticketing system built using Flask, MySQL, and Bootstrap to create a lightweight, intuitive application aimed towards small-medium sized businesses. The aim of the application is for easy setup with minimal configuration to help get a business up and running as it gives the company the tools for its ticketing and support system to assign and track computer systems, manage ticket systems to keep its machines operating at peak performance, and the relevant tools to keep tickets and computer systems in check. We hope to present a minimal viable product (MVP) of Pycket showcasing an easy-to-use, intuitive ticketing and support software espousing the design and values outlined above. A minimum viable product is a product that is functioning but not at the final stage of development. Our MVP is going to be developed with sufficient features and a working ticketing system.
The Anti-Aggregation Properties of $\alpha$-crystallins and Their Role in Lens Development
Alexis Butterbaugh

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

The National Eye Institute states by the age of 80, more than half of Americans will have developed cataracts, the leading cause of blindness worldwide. Age related cataracts result from the breakdown and aggregation of lens proteins. Gene mutations also cause congenital cataracts in young people. Past research shows that cataracts are inhibited by lens proteins called $\alpha$-crystallins. However, it is unclear what role $\alpha$-crystallins play in the normal development of a lens required to avoid early onset cataracts. In this study we addressed the role of $\alpha$-crystallins by using two strains of zebrafish with abnormal lenses. One strain was engineered in our laboratory to lack one of the three zebrafish $\alpha$-crystallins, resulting in subtle lens abnormalities. The second strain has a gene mutation that causes severe lens abnormalities. We developed a method that uses DNA plasmids injected into zebrafish embryos to add proteins to the lens. Control experiments with a plasmid containing a jellyfish green fluorescent protein gene showed that these plasmids work. We subsequently injected a plasmid driving expression of $\alpha$A-crystallin into embryos with slightly abnormal lenses and characterized the result. These embryos showed a reduction in roughness of the lens nucleus, but an increase in fiber cell disorganization and lens pitting. Our current results suggest that $\alpha$A-crystallin does affect lens development. These results are relevant to understanding the developmental role of $\alpha$-crystallins and their potential use in prevention of lens cataracts.
Coping Amidst Familial Absences: Parental Abandonment in Celeste Ng’s *Everything I Never Told You*

Madeline Worcester

Student’s Major: Integrated Language Arts
Faculty Sponsors: Dr. Maura Grady, English

The earliest stages of childhood development are crucial in developing healthy communication skills and proper coping mechanisms for handling grief. Until adolescence, children typically reflect the mannerisms and perspectives of their parents; as a result, children with abusive or neglectful guardians may inherit poor processing skills in conjunction with their parents’ behavior. In her 2015 novel *Everything I Never Told You*, Celeste Ng explores the intricacies of parental abandonment and childhood coping mechanisms through the lens of the fictional Lee family. Because Marilyn (the mother) runs away without offering an explanation, both her son and daughter discover private means of escapism, unknowingly paralleling their mother. *Everything I Never Told You* illustrates the dangers of strict feminine stereotyping while raising women, and it utilizes a number of symbols throughout a nonlinear timeline to convey the lure of running away despite obstacles and external obligations. This presentation will examine the depth of Marilyn’s escape as a mother and the effects this has on her children, with manifestations such as her son’s space infatuation and her daughter’s suicide. It will also address the role of feminist ideals in school and the workforce—or the lack thereof—and their impact on unconventional women in the twentieth century.
Cadmium in Jewelry
Maria Kern

Student’s Majors: Toxicology & Forensic Biology
Faculty Sponsor: Dr. Jeffrey Weidenhamer, Chemistry

Most exposures to the toxic heavy metal cadmium come through consumption of trace amounts in food and tobacco smoke; however, cadmium is often used to make jewelry due to its shiny appearance, low cost, and low melting point. This can result in additional exposure to children who mouth or swallow these items. While jewelry may not be marketed directly to children, it may be obtained by children due to low cost (typically around $1-$5). The US currently does not regulate the cadmium content of jewelry that is not considered children’s jewelry. My objective was to determine the potential of high-cadmium jewelry to release cadmium if mouthed or swallowed by children. Eighty inexpensive jewelry samples were screened for cadmium by X-ray fluorescence. High cadmium samples were extracted at body temperature with dilute NaCl to simulate mouthing and dilute HCl to simulate swallowing. After the initial extractions, jewelry pieces were damaged to determine whether damage to the outer surface increased release of cadmium. After extractions were complete, the total cadmium content of the samples was determined. Cadmium concentrations of all solutions were determined by atomic absorption spectrometry. Thirty-four total replicates of nine jewelry items were extracted as described. The mean cadmium release in the initial NaCl extractions was 0.720 mg, and in initial HCl extractions was 0.066 mg. After damage, the mean release of cadmium in the NaCl extractions was 5.044 mg, and in HCl extractions was 32.32 mg. The high levels of extractable cadmium underscore the danger posed by this jewelry.