



THE SECOND

UNDERGRADUATE SPRING SYMPOSIUM

Saturday, April 14, 2018

1p.m.- 3:30p.m.

Mountainlair Ballrooms

Welcome to the 2018 *Second Annual Undergraduate Spring Symposium*.

Today, I want to encourage you to talk to the undergraduate students about their research. Some are Honors College students and some are not. Undergraduate research is an opportunity open to all WVU students. Find out what these students are doing and why. Ask them about their experiences as undergraduate students at WVU. I am confident you will find students passionate about their research and about their experiences as WVU students.

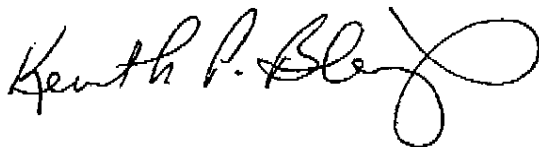
WVU is committed to offering its students opportunities that reach beyond the lecture hall. We encourage students to be creative within their discipline or a related one, and add value to their degrees and later to the U.S. workforce. West Virginia University's strong support of undergraduate research is natural given its classification as a top research (R1) institution. The R1 ranking belongs to only 115 of the nearly 4500 institutions of higher learning in the U.S., denoting the highest level of research activity.

Looking over the titles, author names, and affiliations for the 106 poster presenters, I am struck by how many posters relate to issues of state and national importance. I am also impressed by the large number of WVU faculty members who mentor one or more undergraduates. These connections can last a lifetime.

Tom Cech, past president of the Howard Hughes Medical Institute, noted that while undergraduate research is the most inefficient teaching we have, it is also the most life transforming, and we need more of it. This has been my personal experience both as an undergraduate student and as a faculty member.

I hope that when you join the Mountaineer family you will take advantage of opportunities like these to discover new worlds and build a strong resume for your career and/or graduate school.

Best regards,



Kenneth P. Blemings, PhD
WVU Honors College Dean
Professor of Nutritional Biochemistry

ORGANIZING COMMITTEE

Dr. Kim Barnes, Director, Intercollegiate Biochemistry Program
Dr. Ken Blemings, Dean, Honors College
Dr. Kevin Gooding, Living-Learning Community Coordinator, Honors College
Dr. Kimberly Quedado, Assistant Director, Office of Undergraduate Research
Dr. Michelle Richards-Babb, Director, Office of Undergraduate Research
Kevin Walden, Program Specialist, Office of Undergraduate Research

We want to take this opportunity to thank our undergraduate presenters. Their willingness to present and discuss their scholarly activities is greatly appreciated.

In addition, special thanks to our faculty mentors. Scholarly activities, such as research and creative endeavors, enrich the academic training of our students by establishing mentoring relationships and promoting intellectual independence and curiosity. Our students are indebted to the faculty who mentor them in research!

SPONSORS

The *Second Annual Undergraduate Spring Symposium*, which enhances scholarly opportunities for undergraduate students attending West Virginia University, has been enriched by the contributions, funding or otherwise, provided by the WVU programs below. We are deeply appreciative and want to thank all our sponsors for their time, effort and support of scholarly activities at WVU. Thanks to:

- Undergraduate Admissions (<https://admissions.wvu.edu/home>)
- Office of Undergraduate Research (<https://undergraduateresearch.wvu.edu/home>)
- Biology Department (<https://biology.wvu.edu/>)
- American Chemical Society-Student Affiliates (https://iserve.wvu.edu/agency/detail/?agency_id=78710)
- Undergraduate Intercollegiate Biochemistry Program (<https://biochemistry.wvu.edu/>)
- Research Apprenticeship Program (RAP; <https://undergraduateresearch.wvu.edu/students/programs-at-wvu/rap>)
- Office of the Provost (<https://provost.wvu.edu/home>)
- SpeakWrite (<https://speakwrite.wvu.edu/>)
- Honors College (<https://www.honors.wvu.edu/>)
- Biochemistry Club

SCHEDULE (Saturday April 14, 2018)

11:00-11:30 am (in Ballrooms, Mountainlair)	<u>Poster Setup</u> – Undergraduate presenters arrive, register and put up posters. Most presenters will leave for free lunch (MtnLair, 1 st floor) and return at 12:45 pm. RAP participants are to stay for RAP celebration.
11:30 am-12:45 pm	<u>RAP Celebration</u>
1:00-3:15 pm	<u>Poster Presentations</u> – Open to all and concurrent with category judging.
3:15-3:30 pm	<u>Awards Ceremony and Closing Remarks</u>
3:30 pm	<u>Poster Take Down</u> – Any posters remaining after 3:30 pm will be removed by the staff.
5:00 pm (in Bluestone Room, Mountainlair)	<u>Speaker</u> – Dr. Ivor Knight will speak on “ <i>Genetic Fortune-Telling: The Science and Technology of Using Genes to Discover our Past and Predict Our Future</i> ” (Speaker sponsored by the Intercollegiate Biochemistry Program)

ABOUT THE SPEAKER

Dr. Ivor Knight is Associate Dean for Research and Graduate Studies and Professor of Biology at Penn State University, The Behrend College.

Dr. Ivor Knight recently joined Penn State University to lead research and graduate programs at the Behrend College in Erie, PA. Prior to this academic appointment he was Senior Vice President and Chief Technology Officer at Canon BioMedical, Inc. where he established Canon's genomics R&D organization in Rockville, Maryland. While at Canon he led the development and commercialization of products that increase the speed and accuracy of genetic testing. Prior to joining Canon, Dr. Knight was a professor at James Madison University in Harrisonburg, Virginia, where he taught and conducted research in molecular genetics and microbiology. He has published widely in his field and is an inventor on numerous patents. He holds a Ph.D. from the University of Maryland, a B.S. in Animal and Veterinary Science from WVU, and is a Fellow of the American Association for the Advancement of Science.



POSTER JUDGES

Last	First	WVU Affiliation	Category Judged
Brady	Laura	English, Eberly College	Humanities/Non-STEM
Singh-Corcoran	Nathalie	English, Eberly College	Humanities/Non-STEM
Toffle	Constance	Psychology, Eberly College	Behavioral Sciences
Thompson	Ryan	Communication Studies, Eberly College	Behavioral Sciences
Olfert	Melissa	Human Nutrition and Foods, Davis College	Behavioral Sciences
Leary	Miriam	Human Nutrition and Foods, Davis College	Behavioral Sciences
Barr	Makenzie	Human Nutrition and Foods, Davis College	Behavioral Sciences
Gallagher	Jennifer	Biology, Eberly College	Biological Sciences
Skibicki	Sam	Biology (Ecology), Eberly College	Biological Sciences
Chapman	Phil	Biology (Neuroscience), Eberly College	Biological Sciences
Winans	Matt	Biology (Genomics), Eberly College	Biological Sciences
Ayers	Michael	Biology (Genomics), Eberly College	Biological Sciences
Robich	Rebecca	Biology (Neuroscience), Eberly College	Biological Sciences
Eastman	Brooke	Biology (Ecology), Eberly College	Biological Sciences
Grushecky	Shawn	Energy Land Management, Davis College	Environmental Sciences
McNeil	Brenden	Geography, Eberly College	Environmental Sciences
Panaccione	Dan	Plant and Soil Sciences, Davis College	Environmental Sciences
Olfert	Mark	Human Performance-Ex. Phys., HSC	Molecular Biology & Biochemistry
Purazo	Marc	Cancer Cell Biology, HSC	Molecular Biology & Biochemistry
Kaulagari	Sridhar Reddy	HSC	Molecular Biology & Biochemistry
Garza	Javier	Animal Science, Davis College	Molecular Biology & Biochemistry
Osborn	Joshua	Chemistry, Eberly College	Physical Sciences
Morris	Melissa	Freshmen Engineering, Statler College	Physical Sciences

We want to take this opportunity to thank our poster judges. Their willingness to act as judges for this event enhances the presentation skills of our presenters through personalized feedback!

PARTICIPANTS (1st Authors only)

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Ackerman	Amanda	Psychology	75
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Investigating Potential Relationships between Preferred Listening Styles and Active-Empathic Listening Behaviors

Poster 106

Jay R. Willson,* Logan R. Orloff* and Scott A. Myers (Communication Studies)

ABSTRACTS

Humanities/Non-STEM Category

Poster 1

Monetary Amenity Discrepancies in Nation-to-Nation Treaty Making: Plain and Simple

Michael V. Amato* and Bonnie Brown

Native American Studies Program, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Political Science-Native American Studies (Social Sciences)

Student's Major: Political Science: Pre-law and Legal Studies; World Languages, Literatures, and Linguistics: Spanish; History

As one may or may not be aware of, Indian Tribes, as defined, named, and displayed through Article I, Section 8 of the United States Constitution, were seen by the document's framers as individual, sovereign nations. Many Indian Tribes engaged in treaty-making with the United States Federal Government, and from 1778 to 1871, over 300 agreements were signed between the two groups. The following research attempts to explain, through statistical analysis, why there were monetary discrepancies in the per-acre valuation of land ceded by Indian Tribes from one of these treaties with the United States Federal Government to the next treaty. Discrepancies over time, discrepancies based upon geography, and discrepancies involving micro-factors, such as merely the individual person negotiating the treaty, have all been researched, analyzed, and addressed in an attempt to identify one key variable to explain the variance between the way different Native American land cessions were valued through the agreed terms of the treaties that concerned them. This research has been done fully aware of the overarching theme throughout these chiefly one-sided treaties as a whole, which is that Native American tribes customarily ceded land to the United States Federal Government at inequitably-low costs, regardless of the tribe-to-tribe valuation differences.

Funding: Not funded

Program/mechanism supporting research/creative efforts: WVU Special Topics course (NAS 493N) combined with voluntary extra efforts

Poster 2

Reproductive Politics in "Almost Heaven"

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Field (Broad Category): Sociology (Social Sciences)

Student's Major: Sociology & Political Science

While West Virginian women used to have better access to a variety of reproductive health services, a political shift may be related to the closure of multiple clinics. The state has a single abortion clinic and a single Planned Parenthood (not providing abortion services) resulting in transportation problems that are exacerbated by a 24-hour waiting period. We want to confirm that the political shift is what has led to less access for West Virginia women. We propose to examine abortion-related legislation introduced for the last 20 years. We will examine the text of the bill, along with news coverage associated with the bill in the Charleston Gazette, the state's main newspaper. We will use content analysis to look for gender, race and income-based arguments for limiting access to abortion services in the state. Understanding why legislators want to limit women's access to reproductive health will help us to determine to potentially reopen some of the figurative doors to complete reproductive health care.

Funding: Not Funded

Program/mechanism supporting research/creative efforts: SOCA 495 Honors Independent Study

Poster 3

Examining Consonant Age of Acquisition Effects in Native Arabic Speakers

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Field (Broad Category): Communication Sciences and Disorders (Social Sciences)

Student's Major: Speech Pathology and Audiology

In recent research, it has been hypothesized that speech sounds learned first in development might be processed differently than speech sounds that are learned later in development. This has been studied using a variety of tasks that look at English listening, reading, and speaking skills in children and adults, in which performance decreased with stimuli comprising only later-developing consonants compared to stimuli comprising only earlier-developing consonants. The purpose of this study is to test whether the same differences in processing can be observed in adults who acquired English sounds in a different order than native English speakers. Twenty-five native-Arabic speakers who learned English as a second language will be recruited for the study. Participants will complete a one-time experimental session approximately 45-60 minutes in length. After signing a consent form, each participant will complete a brief history questionnaire; a speech and hearing screening; several tasks related to listening, reading, speaking, and cognitive skills using standardized tests (e.g. PPVT, CTOPP-2, WRMT-III); and three experimental, computer-based tasks in which the stimuli systematically vary in their make-up of earlier-developing and later-developing consonants. Data analysis will assess whether consonant age of acquisition significantly predicts performance on the experimental tasks. The results have the potential to make a significant contribution to our understanding of how speech sound knowledge is utilized in language and reading.

Funding: Not Funded

Program/mechanism supporting research/creative efforts: WVU 497-level course and CSAD 498A Honors Independent Study

Poster 4

Impact of School District Size on Education Quality

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Field (Broad Category): Education (Business)

Student's Major: Accounting

This paper examines the impact of district size on student academic performance using school level data provided by West Virginia Department of Education. An education production function is estimated, with the WESTEST 2 Assessment (a standardized, annual test used to measure students' progress from third to eleventh grade) data as the dependent variable. Controlling for characteristics of the student population such as family and peer effects and other school-level environmental factors related to family size, district size is related to student achievement. The paper will take these variables into account as well as the commonly associated positives and setbacks of large districts. The results of my empirical analysis are used to inform a discussion of the optimal size of West Virginia school districts and issues related to school consolidation. With these results, the education system can devise a plan best suitable to accommodate the state, while encouraging academic excellence. The results will also yield an answer as to if it's economically wise to condense schools.

Funding: Institutional (WVU)

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 5

Julian of Norwich: The Female Body in Divinity

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Field (Broad Category): English (Humanities)

Student's Major: English

Julian of Norwich, an anchoress and prominent figure in mystic literature, wrote two texts that lent authority to the vernacular and offered a new understanding of Christian doctrine. After suffering from a bodily illness, Julian received a series of revelations that influenced the development of her own theology. Focusing on primarily her Short Text, I argue that Julian used the image of blood to create a place for the female body in divinity, advocating for bodily processes such as menstruation and childbirth, lending direct authority to maternity, and challenging perceptions that were held at the time of her writing. In the Middle Ages, the value or women's blood was routinely questioned, and contributed to how they were written in literature. To examine her text, I will utilize literary criticisms, such as historical and feminist, in order to develop my own interpretation of the text and evaluate how the bodies of Julian, Christ, and Mary serve to establish femininity in a patriarchal theology.

Funding: TRIO, Department of Education

Program/mechanism supporting research/creative efforts: McNair Scholars Program

Poster 6

The West Virginia Building and its Ties to the Century of Progress Exposition

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Field (Broad Category): History (Humanities)

Student's Major: Art History

The story goes that the West Virginia building at Jackson's Mill in Jane Lew, West Virginia, housed the state's exhibit at the 1933 Century of Progress Exhibition in Chicago. After the fair ended, the building was disassembled, removed from the fair's grounds and shipped by train back to West Virginia where it was rebuilt and now resides. The myth has existed since the building was erected and is still accepted as the history of the building. This research separates the myth from the facts by closely studying the historical record of the fair and examining the archival evidence that exists in the Jackson's Mill archives. This project will demonstrate that the West Virginia building at Jackson's Mill was newly designed and built to exhibit the artifacts that the state brought to the 1933 world's fair in Chicago and was created to give those who did not have the means to visit the world's fair an opportunity to visit their state's exhibit.

Funding: Not Funded

Program/mechanism supporting research/creative efforts: ARHS 494 Art History Seminar

Poster 7

Gilded and God: Space, spirituality, and sculpture in the Chapel of the Blessed Sacrament

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Field (Broad Category): Art History (Creative Arts)

Student's Major: Art History

The altarpiece in the Chapel of the Blessed Sacrament in St. Peter's Basilica is one of the last works of art created by Gian Lorenzo Bernini. Through visual and contextual analysis of Bernini's lifework at St. Peter's Basilica, this study explores his use of space, sculpture and architecture to express mysticism, emotion, and promote spirituality. This study demonstrates how the altarpiece, the iconography of the figures, and the compositional placement of the sculpture reveal Bernini's artistic vision within the Vatican. Further research into the visual science of art as well as religious doctrine offers insight into how the perception of space allows for a deeper and more profound understanding of the work within the context of the period while also developing a better understanding of the spiritual themes conveyed by the Chapel's altarpiece.

Funding: TRIO, Department of Education

Program/mechanism supporting research/creative efforts: McNair Scholars Program

Poster 8

The Role of Letters During the Napoleonic Wars

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Field (Broad Category): History (Humanities)

Student's Major: English & History

When many think of smuggling during the Napoleonic Wars they automatically think of smuggled war material and other goods, not letters. However, during these years we know that communication with Britain in France was illegal and hard to achieve due to the constraints of the blockade. Despite this, communication between the two countries continued. Inspired originally by the article, "Philosophical Intelligence: Letters, Print, and Experiment during Napoleon's Continental Blockade" by Iain P. Watts, this project will examine all types of information shared in letters, including scientific information from 1806 to 1814 between Britain and France. Although science is often focused on collaboration, during this time both countries were competitively trying to outdo the other, especially in electrochemistry or advancements that would prove useful for the war effort. The article specifically focuses on Sir Charles Blagden, a middleman between other patrons of science whose archives still exist. Common forms of smuggling these scientific breakthroughs were through papers personally carried by diplomats from the neutral America, merchants, and sometimes the state itself. Print sources were often moved along with letters, and scientists kept up a steady correspondence with each other, although there were often long gaps in between receiving the letters. In Britain, this was a semi-official process and Napoleon himself even made an exception for the sharing of scientific knowledge that was not made for personal or business correspondence.

Funding: Not Funded

Program/mechanism supporting research/creative efforts: Voluntary efforts

Poster 9

Chestfeeding: Lactation Inclusivity and the Transgender Community

Jenny Richards* and Leslie Tower

School of Social Work, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Social Work (Humanities)

Student's Major: Social Work

Chestfeeding describes the act of nursing a child through lactation. This is a unique term that is used by the transgender community which is preferred to breastfeeding due to its gender neutrality. There is little research being done on this topic and therefore, an alarming lack of resources for transgender individuals exists. We conducted a literature review on the research that has been done in order to understand how to be inclusive of all individuals and the need for amendments to work/life policies, specifically regarding lactation needs. In short, we saw a significant lack of policies for transgender-specific needs and a knowledge gap in the medical field. This conclusion would suggest that going forward we need to develop policies that are inclusive of transgender individuals and create a better relationship between the transgender and medical communities. However, in order to avoid perpetuating stereotypes and taboos, we must do so in a way that uses proper and preferred terminology, viewing and presenting data objectively, and being sensitive to the needs and concerns of the communities involved.

Funding: Not Funded

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 10

Stick Together or Break Apart: Unplanned Alliance Dissolution in Light of Adverse Events

Vasant Saladi,* Gulnara Zaynutdinova,* Miles Zachary,* Deborah Philippe* and Olga Bruyaka

College of Business and Economics, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Management (Business)

Student's Major: Petroleum Engineering

Companies often make decisions of staying in an alliance or breaking apart. On one hand, long term alliances help partners during market downfalls and provide long-lasting benefits. On the other hand, alliances between self-interest partners will result in more unstable relationships. We have developed a theoretical argument from literature on alliance instability to explain when partners stick together or break apart. Specifically, we suggest that adverse events that are severe could have been avoided and that receive a lot of media attention will increase the probability of alliance partners leaving the alliance. In addition, if a stock market reaction to an adverse event is negative and significant alliance partners will have even more incentives to break apart. We have introduced the external perspective on alliance stability by studying how adverse events, positive or negative media coverage, and market reaction affect existing alliances which determines if partners stick together or not. We conduct empirical research on the U.S airline industry (1985-2016) and discuss how our research advances the literature on alliance instability.

Funding: Institutional (WVU College of Business and Economics)

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 11

Swiss Settlement in Randolph County, West Virginia: Land Deals, Policies, and Community Building

Elizabeth Satterfield* and Hal Gorby

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Field (Broad Category): History (Humanities)

Student's Major: History

Beginning in 1869, Swiss immigrants, first men followed by their families, settled in Randolph County, establishing first the village of Helvetia followed by seven other communities in the outlying area. Encouraged to immigrate by both private landowners and land agents as well as the West Virginia state government, Swiss immigration to Randolph County peaked in the 1870s when state support was at its greatest but trickled out in the 1880s after a shift in state party politics. Because of land ownership problems which led to poor national and international publicity concerning the state of West Virginia, the flow of Swiss immigrants dramatically declined, and West Virginia state policy and attitude toward immigration changed significantly. Despite enduring hardships, Swiss settlers created thriving communities founded on their common heritage of religion, education, language, agriculture, music, dance, food, and most importantly family. This study on the Swiss of Randolph County serves as a case study for land selling and buying trends in post-Civil War West Virginia as well as the active role both private persons and public entities played in Swiss settlement.

Funding: Not Funded

Program/mechanism supporting research/creative efforts: a capstone course within my department

Poster 12

Energy Literacy in Agricultural Education Students in West Virginia

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Field (Broad Category): Agriculture (Education)

Student's Major: Agricultural and Extension Education

Agricultural Education works to inform middle and high school students about the industry which provides food, clothing, and shelter to the world around them. In West Virginia, the coal and energy industry provide a majority of the state's revenue and are the areas of top production for the state. In order to gain an understanding of energy literacy in agricultural education students in West Virginia, a 70-question survey was developed. This survey will be distributed to 15 different high schools with agricultural education programs across the state; five in the eastern region, five in the central region, and five in the western region. Results of this survey will be compiled by Qualtrix Database and analyzed by the research team as well as current and future agricultural educators. Findings will assist in identifying areas for improvement in energy literacy across the state and will be further used to develop a curriculum for energy literacy to be used for future West Virginia agricultural education students. Knowledge gained by future students through this curriculum will ensure students ability to make educated and safe choices when working in careers in and around the energy industry in West Virginia.

Funding: Not Funded

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 13

Slave Drumming Bans in Colonial America

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Field (Broad Category): Music Therapy (Creative Arts)

Student's Major: Music Therapy

The institution of slavery developed rapidly in Colonial America, causing major societal and legislative changes. In a seemingly perpetual cycle, slaves rebelled due to poor treatment, and white landowners and legislators made slave codes stricter with acts enforcing increasingly more brutal punishments for such rebellions. One of the many restrictions that was included in the slave codes of Southern states banned slaves from possessing drums. This was not simply taking away a hobby or pastime for slaves, it was taking away a part of their culture. To make a clearer narrative of how this ban on drumming transpired, we have compiled the slave codes of Colonial America with the publications of authors and researchers in the areas of colonial slavery and early African-American music. We found that the ban on drum ownership is attributed to the white landowners' fear of the communal style of African drumming and its ability to bring slaves together in rebellion. We have also studied the implementation of slave codes to find in which state the ban on drumming was first established and then found the same ban later enacted in the codes of other states.

Funding: Federal Work Study Program

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 14

Research Apprentice in Theatre Materials and Puppetry

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Field (Broad Category): Creative Arts

Student's Major: Theatre

At WVU, what a faculty does for research can vary between disciplines. In the arts, research is illustrated within the working process and/or with the completed artistic project. Theatre is no exception. The artistic project at hand is researching and creating Bunraku puppets for a live theatre production of "The Soldier's Tale." The motivation behind this is to bring unique character designs to life using neoprene as the main experiment. This is done by first sculpting each puppet part out of clay. A wall is created around the finished sculpture with more clay that will be covered with plaster to create the mold. Once the molds are shaved down, they are filled with neoprene that hardens over time creating individual parts of the puppet. Lastly, the puppet parts will be shaved, painted, and attached to create the full, moveable figure. The leading problems are experimenting with different types of neoprene, and being able to join the puppets for accurate movement. Managing the weight is an issue if the previous steps are done incorrectly. These construction techniques are determined through trial and error. The puppets must look identical to the character renderings to be appropriate for the production. The experiment is still in process, but the final results will be seen at local performances and national conferences.

Funding: Not Funded

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Physical Sciences Category

Poster 15

Nickel-Catalyzed Oxidative Decarboxylative Coupling Reactions: Exploring the Role of Silver

Sierra Ciccone* and Jessica Hoover

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Field (Broad Category): Chemistry (Sciences)

Student's Major: Chemistry

Oxidative decarboxylative coupling reactions have broad applications in synthetic and medicinal chemistry. These coupling reactions are effective at generating C–S, C–C, C–N, and C–X bonds using abundant carboxylic acids as the starting material. While copper and palladium catalyzed oxidative decarboxylative coupling reactions have been well studied, recent work in our group has shown nickel to be an effective catalyst. The nickel has been seen to be an effective catalyst when silver salts are used as the oxidant. These oxidative decarboxylative coupling reactions are especially interesting to us because of their common limitations to pentafluorobenzoic acids and o-nitrobenzoic acids starting materials. In this study, decarboxylation and transmetalation have been investigated in order to explore the role of nickel and to explore the role of silver. Our approach involves the synthesis and reactivity studies of relevant organometallic intermediates in order to better understand the nature of the decarboxylation and transmetalation steps, in particular as they relate to the common substrate limitations.

Funding: Institutional (WVU SURE Program & C. Eugene Bennett Department of Chemistry)

Program/mechanism supporting research/creative efforts: a WVU 497-level course

Poster 16

One-Pot Synthesis by Use of Catalyst and Styrene Derivatives Yielding Difunctional NSAIDs

Amy Gregory* and Trina Perrone

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Field (Broad Category): Chemistry (Sciences)

Student's Major: Chemistry

Nonsteroidal Anti-Inflammatory Drugs (NSAIDs), such as Ibuprofen (Advil®) and Naproxen (Aleve®), are a class of drugs used to reduce pain, fever, and inflammation. For many people, extended use has no adverse effects, but for some it can cause gastrointestinal and retinal issues. The pharma core of NSAIDs arise from phenyl propionic acids. Our research group uses a copper catalyst to create a difunctional derivative that contains a highly functionalized carboxylic acid with an installation of a boron. Utilizing the alkene on styrene derivatives, a carboxylic acid and boron are added across the double bond. The installation of the functional groups is created in a one-pot synthesis. This method involves the use of a copper catalyst, a first-row transition metal that is relatively cheap, and carbon dioxide (CO₂), which is a renewable and recyclable carbon source. Boron is minimally available in certain fruits and vegetables, naturally. Specifically, boron containing compounds have recently been used for therapeutics, such as some anti-cancer drugs, and is a promising drug discovery in medicinal chemistry.

Funding: Institutional (WVU)

Program/mechanism supporting research/creative efforts: a WVU 497-level course

Poster 17

Synthesis of a Cyclophane Bearing Two Benz[a]anthracene and Two Naphthyl Units

Josef C. Heller,* Haresh Thakellapalli, Behzad Farajidizaji, Shuangjiang Li, Yu Zhang, Novruz G. Akhmedov, Carsten Milsmann, Jeffrey L. Petersen and Kung K. Wang

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Field (Broad Category): Chemistry (Sciences)

Student's Major: Biochemistry

Benzene and its derivatives manifest unique electrical and chemical properties as a result of aromaticity, the unique ability of high-energy electrons to resonate around a cyclic structure. By connecting aromatic compounds together in a larger ring, even more novel properties are manifested as this resonance is extended to the macrocyclic cyclophane. Substituting these cyclophanes with additional functional groups such as ethers, esters, and other heteroatoms introduces a variety of other properties and is a subject of significant interest in the field of organic synthesis. A synthetic pathway to a cyclophane bearing two benz[a]anthracene units connected at 5 and 7 positions through two naphth-1,4-diyl groups was developed and its structure was confirmed by X-ray structure analysis. Because of structural constraints, the two naphthyl groups are distorted from planarity and the bonds connecting them to the benz[a]anthracene units are bent significantly. The UV-vis and fluorescence spectra of the cyclophane are red-shifted from 7-(1-naphthalenyl)benz[a]anthracene, which is the corresponding monomeric polycyclic aromatic hydrocarbon. The cyclophane synthesized by our group resembles the substructures of various fullerenes and could be used as a seeding structure for fullerene synthesis. Further investigation of this compound could reveal a new synthetic route for benz[a]anthracene, as well as opportunities for functionalization of aromatic groups and various applications in material science.

Funding: Federal (NSF)

Program/mechanism supporting research/creative efforts: a WVU 497-level course

Poster 18

How Temperature Affects the Weathering of Gasoline

Isaac C. Willis,* and Glen P. Jackson

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Field (Broad Category): Forensics (Sciences)

Student's Major: Chemistry & Forensic and Investigative Sciences

Arson investigations are often influenced by identification of ignitable liquid residues (ILR) in fire debris. ILR analysis is most commonly achieved through headspace extraction, isolating vapors above the sample, followed by gas chromatography mass spectrometry (GC/MS). Previous research has shown that as ILs evaporate, or weather, the most volatile components evaporate first, resulting in a relative increase in concentration of the remaining substances. Recent work has shown that the temperature at which weathering occurs influences relative evaporation rates of different substances, and so, has a major effect on the distribution of weathered residues. This project will expand on the previous findings by evaporating a simplified synthetic mixture of gasoline in a quantitative manner at higher temperatures than has been previously reported. Current findings appear to corroborate the previous results and mathematical model, which show that a residue weathered to a high percent at a high temperature more closely resembles a residue weathered to a somewhat lower percent at room temperature. This contradicts traditional crime laboratory practices of comparing similar percent weathering, achieved at different temperatures.

Funding: Institutional (WVU & West Virginia Research Challenge Fund)

Program/mechanism supporting research/creative efforts: WVU's SURE Program

Poster 19

Evaluation of Fingerprint Images Captured with the RUVIS and DSLR Camera

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Field (Broad Category): Forensics (Sciences)

Student's Major: Forensic Science

The most common method used to image fingerprints is by use of a digital camera. This has resulted in the reflective ultraviolet imaging system (RUVIS) being overlooked despite it being a viable option when it comes to fingerprint imaging. Little work has been published pertaining to the use of the RUVIS to image fingerprints. The RUVIS utilizes shortwave ultraviolet (UV) light that is reflected off the surface upon which the fingerprint has been deposited. A quartz lens allows the reflected UV light to be transmitted to the imaging system. The print appears either lighter or darker (depending on the position of the lighting) in contrast to the background. The aim of this study is to compare the quality of the fingerprints when imaged by the RUVIS and a Nikon D810 camera. The quality of the imaged fingerprints were assessed using the fingerprint match score when processed through an automated fingerprint identification system (AFIS) and its database. Known fingerprints were placed on four objects, representing a variety of surfaces, then developed using the cyanoacrylate fuming process, and then imaged. Each fingerprint image was entered into the AFIS and the minutiae were marked up. The marked up latent fingerprint was then searched against the AFIS database. Improving fingerprint image quality will result in the improvement of search accuracy of unknown prints to known prints.

Funding: Not Funded

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 20

Pulsar Searching in the 2011-2014 Driftscan Data

Olivia Young,* Gabriella Agazie and Maura McLaughlin

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Field (Broad Category): Astronomy (Sciences)

Student's Major: Physics

Our research focuses on searching for pulsars in data taken at the Arecibo Observatory in Puerto Rico. Pulsars are extremely dense and fast spinning neutron stars that are characterized by the beams of radio waves emitted from their magnetic poles. The rapid spinning of pulsars causes the beams to have a lighthouse effect that is detectable by radio telescopes, such as the Green Bank Telescope and the Arecibo Observatory. The properties of pulsars make them the most accurate celestial clocks in our galaxy. Pulsars emit a broadband signal that can be detected across a wide range of radio observing frequencies and also have a very stable spin period that makes it possible to predict the times at which pulses from a particular pulsar will arrive at a radio telescope. Searching for very small changes in the apparent spin period of a pulsar could lead to the detection of gravitational waves from merging galaxies in the distant universe. Thus, it is very important to find and document as many pulsars as possible to expand the field of radio astronomy. Astronomers estimate that there are over 200,000 pulsars in our galaxy, although only about 2,600 have been discovered thus far. When a potential pulsar candidate is found, a process called pulsar timing is used to get the most accurate measurements of the time of arrival of the pulses, spin period, and dispersion measure. The primary goal of our research is analyzing data from the 2011- 2014 Arecibo drift scan in search of new pulsars. This drift scan is comprised of many hours of data in which the telescope was set to receive signals in the 350 MHz range, and recorded incoming data as the rotation of the earth caused different regions of the sky to "drift" into the telescope's field of view. Although these data sets were taken several years ago, there is still much work to be done, and many new pulsars to be discovered. Part of the work we do is to search for known pulsars, which both ensures that data taken are sound and provides new information on the pulsar. Because of how extensive the drift scan is, we expect to be able to identify several hundred known pulsars. However, perhaps the most exciting development is that we have found several plots in the data that may be new pulsars. Follow-up observations will be conducted at Arecibo, after which we can determine whether they are real and begin a long-term campaign to measure their properties.

Funding: Federal (NSF)

Program/mechanism supporting research/creative efforts: Voluntary efforts

Poster 21

Observations of Possible Supermassive Black Hole Binary in Distant Galaxy

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Field (Broad Category): Astronomy (Sciences)

Student's Major: Physics

Galaxy J1018+3613 is approximately 700 million light years away and was first identified as a possible single-cored merger remnant by the Galaxy Zoo citizen science project. These galactic merger events are important sources of gravitational waves that the pulsar timing array method will be able to detect in the near future. We subsequently made follow-up observations of the core of this galaxy using the Very Long Baseline Array radio telescope. In all we collected 22 hours of observational data in three separate radio bands: 2, 5, and 8 GHz. Images generated from our data show two distinct radio sources in the core of galaxy J1018+3613, separated by about 20 parsecs (65 light years) of space. Preliminary analysis yields three possible explanations for this structure. It could be a binary supermassive black hole (SMBH) in active orbit. If so, we could place interesting limits on the continuous gravitational waves from this object. It could also be a recently coalesced SMBH. If this is the case, then the two distinct objects in our images are likely the two lobes of a recently turned-on radio jet. Finally, it is possible that the second black hole in this merger either never existed, is smaller than expected from the merger model, or is simply not yet centralized and is not radio-luminous. Any one of these possibilities represents an interesting discovery. Further multi-wavelength follow-up of this target will help reveal its nature.

Funding: Federal (NSF)

Program/mechanism supporting research/creative efforts: Hired by faculty member

Poster 22

Development and Analysis of a Stokes Polarimeter

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Field (Broad Category): Physics (Sciences)

Student's Major: Physics

An electron trapped in a semiconductor nanostructure like a quantum dot, as used in our lab, is a candidate to act as a quantum bit. Quantum bits can greatly increase computing power; "n" quantum bits (qubits) are equivalent to 2^n classical bits due to superposition. Production of a functioning qubit, relies on three essential processes: initialization, spin manipulation, and measurement of an electron spin state. Initialization and spin manipulation rely on a magnetic field in an orientation known as the Voigt configuration. Measurement, however, relies on a different situation known as a Faraday configuration. Switching the orientation of a magnetic field takes many orders of magnitude longer than the electrons can remain in a coherent state of superposition. To compensate for this, graduate students in the lab are researching a phenomenon known as the AC Stark effect that can momentarily create a pseudo-Faraday state much faster than physically switching a magnetic field so that the electron state can be measured. To properly execute the AC Stark effect, the polarization of the incoming light must be circular. We have created a polarimeter that is able to determine the polarization of incoming light by passing it through a rotating quarter wave-plate, a stationary polarizer, conducting a Fourier transform on the light intensity, then analyzing the frequency components. In addition, we have analyzed and accounted for the true retardance of the wave plate (compared to the nominal retardance), and developed a novel method for the calibration of polarizers using axial referencing.

Funding: Federal (Department of Energy)

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 23

Atomic Force Microscopy of Magnetic Thin Films

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Field (Broad Category): Physics (Sciences)

Student's Major: Mining Engineering

The Holcomb group is investigating why magnetic thin films lose their magnetism. Magnetic materials have a great number of applications, including over one hundred in vehicles alone. Some of the factors affecting the properties of these materials are their roughness and surface termination. Atomic force microscopy (AFM) measurements has been the focus of my research this semester. We have been able to create arrays of data illustrating surface roughness and termination from the AFM images. How AFM works is by taking an atomically sharp object, usually the size of a few atoms, and dragging it across the surface of a sample. This process is able to create a three-dimensional surface image of the sample. Once this is done the sample is analyzed using software called Gwyddion, which decomposes the information into five different categories of data: height, amplitude, phase, z-position, and linescan. As data is analyzed, noise is removed that the AFM tip picks up during the process. After removing the noise, the data files are able to be used and studied. We are able to then take and upload all of our data into a database allowing easier access and analysis for the entire team and gives us the ability to share it with colleagues conducting similar research.

Funding: Federal

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 24

Soft Shot: Designing the Future of Shooting

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*Benjamin M. Statler College of Engineering and Mineral Resources, West Virginia University,
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Field (Broad Category): Industrial Engineering (Media and Design)

Student's Major: Mechanical and Industrial Engineering

This project is designed to expand the market of shooting sports by making a shock absorber more efficient, cheaper, and easier to install. Research has shown that up to 20% of the shooting market is untapped due to the risk of injury associated with recoil. Furthermore, the Soft Shot aims at improving the daily duties of regular shooters within law enforcement, military, and professional shooting. The original prototype was machined out of metal. The first stage of this project focused on redesigning the system based on Design for Manufacturing principles for an injection molding process using polymers. The objectives of this redesign include making a Soft Shot unit over 200 times less expensive to manufacture. Reasons for this significant reduction include the previously mentioned choice of materials and manufacturing process as well as economies of scale. The chosen polymer is significantly less expensive than the metal used for the prototype while remaining strong enough to allow for the conversion of kinetic energy into heat, thus reducing the force of recoil. The Soft Shot has been proven to reduce the force of recoil by up to 70%. The second objective is to design and create a universal install kit that will allow any user to install a Soft Shot device in a variety of weapon stocks. In the next step, 3D scanning will allow for the creation of a gun stock database and therefore more personalized install kits.

Funding: Outdoor Sport Innovations LLC

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 25

Unconventional ELISA Approach in Quantifying Disease Risk

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Field (Broad Category): Chemistry (Sciences)

Student's Major: Chemical Engineering

The prevalence of obesity is high in West Virginia and it is known that obesity couples with the increased risk of many diseases including cardiovascular disease and stroke. To provide better management of these lethal diseases, it calls for a diagnostic system which can be operated by an untrained individual, return critical results within a brief time, be readily available at any time, be available in rural areas, accurately quantify the concentration of biomarkers in a bodily fluid, and be affordable. Developing such a system would allow medical staff to make immediate and important decisions with high confidence. Currently, few systems exist that can be used in point-of-care diagnostics and a major hindrance is the decreased precision and accuracy of these devices due to the lack of a sophisticated sample processing unit. In this work, we utilize acoustic waves as a means to manipulate fluid and particles so that standard ELISA protocol can be carried out in a small and compact platform. The acoustic waves are generated using a commercially available buzzer with a cost of less than 50 cents, and the size of the whole system is comparable to a quarter dollar. Collectively, our method has an advantage over existing point-of-care systems due to increased accuracy and precision while maintaining a similar level of complexity and compactness. We anticipate our method will be an invaluable diagnostic tool for diseases.

Funding: Institutional (WVU Start-up fund & Don and Linda Brodie Resource Fund for Innovation)

Program/mechanism supporting research/creative efforts: a WVU 497-level course

Poster 26

Jump and Landing Detection via Accelerometry

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Field (Broad Category): Exercise Science/Physiology (Health Sciences)

Student's Major: Mechanical Engineering

This study targets precise calculation of take-off and landing times from jumping, with data obtained from an accelerometer. Typically, take-off and landing are calculated using force plates, which calculate ground reaction forces and timing of landing or take off. However, the force plates cost ten times more than the accelerometers; and are not nearly as easy to manipulate around the environment. Acceleration is used in the calculation of forces and, therefore, the data from the accelerometer could be used to obtain forces throughout the jumping locomotion. To find correlations between the two devices, the study will examine the biomechanics of twenty participants as they perform both, a single leg and two-legged jump. The motion of the knee is a key aspect when analyzing jump biomechanics, and an accelerometer placed at the proximal end of the participants' tibia will allow for optimal data collection. A computer program will graph data from the force plate and accelerometer, which will later be analyzed for common patterns. These common patterns would allow the research of jump mechanics to be done in various environments with the portability of the accelerometer, while giving researchers with limited funding, the ability to perform similar studies.

Funding: Not Funded

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Biological Sciences Category

Poster 27

Differential effects of carbon dioxide and temperature on the biomass of *Hirudo verbana*
Patricia H. Doyle,* Michael McKenna and Kevin Barry
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Field (Broad Category): Biology (Sciences)

Student's Major: Biology

Rapid climate change has become one of the greatest indicators of the contribution of human activity to the disruption of the Earth's ecosystems. Two of the most prevalent effects that have increased as a result of human activities are atmospheric carbon dioxide concentration and temperature. In order to assess these effects on freshwater ecosystems, a secondary consumer in temperate freshwater habitats, *Hirudo verbana*, was introduced to 4 conditions in a two-by-two experiment. The two conditions of atmospheric carbon dioxide concentration were 400 ppm and 800 ppm, representing today's level and the projected level in one model. The two conditions of temperature were 19 °C and 29 °C, representing typical temperatures in spring and summer. The effects from carbon dioxide and the interaction between carbon dioxide and temperature were statistically and ecologically significant. We observed a large gap between the seasonal change in biomass at the higher carbon dioxide concentration. At low carbon dioxide concentrations, there was a very small change in the biomass when comparing seasonal temperature changes. This may indicate that carbon dioxide acts as a major stressor that will significantly alter the behavior of *H. verbana* and affect the species that also live in the ecosystem. As the concentrations of atmospheric carbon dioxide escalate, this may affect less sensitive organisms than the leech.

Funding: Institutional (WVU Department of Biology)

Program/mechanism supporting research/creative efforts: capstone course within my department

Poster 28

Genetic Diversity and Morphological Variation in a Vulnerable WV Native Orchid, *Corallorhiza bentleyi*
Nicole Fama*, Brandon Sinn and Craig Barrett
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Field (Broad Category): Biology (Sciences)

Student's Major: Biology

Corallorhiza bentleyi, or Bentley's coralroot, is a self-pollinating orchid species endemic to five counties along the West Virginia/Virginia border. Described in the 1990s, it is known from only about 10 populations, making it one of the rarest species in North America. Rather than using photosynthesis, this plant is fully mycoheterotrophic, meaning it obtains nutrients through a parasitic relationship with a fungus. Patterns of genetic diversity and fungal host specificity for this orchid are poorly understood; such knowledge will be crucial to help maintain the long-term stability of this species. We developed nuclear microsatellite and inter-simple sequence repeat (ISSR) markers to quantify genetic variation within *C. bentleyi* populations. We sequenced the fungal internal transcribed spacer region (ITS) to assess the degree of specificity between the orchids and their ectomycorrhizal fungal hosts. We used floral morphometrics and principal components analysis to analyze morphological diversity among all individuals. Although no genetic variation was found among microsatellite regions, preliminary data from dominant ISSR banding patterns have revealed evidence of genetic variation between *C. bentleyi* populations. Floral morphological measurements showed some distinction between populations at the county level. *Corallorhiza bentleyi* appears to associate with a single species of ectomycorrhizal fungus, *Tomentella fuscocinerea*, meaning that its survival is linked to the presence of this poorly understood fungal species. The ultimate goal is to obtain more information concerning genetic diversity, relationships with its fungal host, and environmental requirements in order to improve conservation efforts of one of the rarest species in southern Appalachia.

Funding: State (West Virginia University Department of Biology)

Program/mechanism supporting research/creative efforts: WVU's SURE program

Poster 29

The Interactive Effects of Coal-pollutant Stress and Seasonal Daylight Periods on *Brassica rapa* plant

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Field (Broad Category): Biology (Sciences)

Student's Major: Biology

Use of coal as an energy source has led to increase in environmental pollutants, mainly taking the form of heavy metals and acid rain; these can have inhibitive impacts on various aspects of plant growth. This study seeks to mimic seasonal climate conditions of West Virginia through manipulation of temperature and photoperiods, and simulate coal pollution by implementing varied levels of selenium and acidity in order to study the impacts on growth of the *Brassica rapa* plant. *Brassica rapa* is being subjected to three seasonal daylight levels: Summer (14-hr daylight periods), Spring/Autumn (12-hr daylight periods), and Winter (10-hr daylight periods). Simultaneously, coal-pollutant stress is being introduced as the following levels: control (pH=5.5, 1 ppm Se), moderate (pH=4.75, 15 ppm Se), and high (pH=4.0, 30 ppm Se). The effects will be analyzed through: above ground height, root length, and above/below ground biomass. These results will provide insight to how acidity and selenium levels affect growth of common, local plants. This is significant as it will allow for a more enhanced perspective on how certain coal combustion pollutants may negatively impact regional ecosystems.

Funding: Institutional (Biology Science Foundation)

Program/mechanism supporting research/creative efforts: capstone course within my department

Poster 30

Assessment of aluminum tolerance in *Salix* for biomass production and reclamation of disturbed lands

Daniel S. Wolodkin,* Tyler J. Davidson and Jonathan Cumming

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Field (Broad Category): Biology (Sciences)

Student's Major: Biology & Mathematics

Short rotation woody culture systems can be used to provide feedstocks for biomass-based energy production. To avoid competition with valuable agricultural land, marginal soils should be used. Such soils can be found within abandoned and reclaimed mines in West Virginia and throughout Appalachia. These mines often contain acidic soils, which are characterized by high levels of aluminum (Al^{3+}). Aluminum acts as a phytotoxin by limiting root growth and causing nutrient deficiencies in plants. Sixteen different lineages of *Salix* were screened for Al^{3+} resistance in a hydroponic system. Root growth and Al accumulation were examined as indicators of Al resistance/sensitivity. Three lineages were selected for further analysis. *Oneida*, which is very resistant to Al^{3+} ; *Fabius*, which is rapid growing; and 94006, which is very sensitive to Al^{3+} . Cuttings of these lineages were grown in either 0 or 100 μM Al^{3+} in hydroponics. Cuttings were harvested after 8 h, 72 h, and 14 d of exposure. The samples will be tested for root Al concentration, shoot Al concentration, and organic acid exudation to provide an integrated model of the mechanisms of Al^{3+} resistance in *Salix*.

Funding: Federal (United States Department of Agriculture)

Program/mechanism supporting research/creative efforts: WVU's SURE program

Poster 31

Assessment of Gene-Knockouts KAP122 and PDR8 in a RoundUp-Resistant strain of *Saccharomyces cerevisiae* BY4741

Jordan Barney,* Tyler Wanstreet,* Edith White,* Apoorva Ravishankar and Jennifer Gallagher
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Field (Broad Category): Biology (Sciences)

Student's Major: Biology

Glyphosate is an herbicide which is commercially used as the main ingredient in RoundUp, a product which inhibits the growth of plants, however through a prolonged use of RoundUp in everyday society there has been an increase in RoundUp resistant plants which in effect could have possible effects on human health. Glyphosate is able to inhibit growth due to its ability to block the shikimate pathway. Glyphosate inhibits the growth of plants and yeast, *Saccharomyces cerevisiae*, commonly known as brewer's yeast by inhibiting the same biochemical pathway. Using *S. cerevisiae* as a model organism, exposure of yeast to RoundUp will select resistant. To achieve this, In Lab Evolutions (ILEs) were performed and the whole genome was sequenced using Illumina through the WVU genomics core. In parallel, genes that are predicted have a role in RoundUp resistance will be tested. The genes KAP122, also known as PDR6, and PDR8 are both involved in the pleiotropic drug resistance phenomenon, which is believed to regulate the chemical, glyphosate. With the resistant strain of BY4741 generated, growth assessment of gene knockouts KAP122 and PDR8 was conducted. Through these experiments, we can gain a deeper understanding about the mechanism of RoundUp resistance.

Funding: Federal (NSF MCB.1614573)

Program/mechanism supporting research/creative efforts: capstone course within my department

Poster 32

A *Drosophila* model of Induced Parkinson's Disease used in Observing Potential Treatment Effects.

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Field (Broad Category): Pharmaceutical Sciences (Sciences)

Student's Major: Biology

Parkinson's disease is a condition that results from neural degeneration or dysfunction within the basal ganglia and the dopaminergic neurons within the substantia nigra regions of the brain. Dopaminergic neurons are responsible for producing dopamine to relay signals that control movement of the body, while the basal ganglial neurons ensure the fluidity of such movement. The degeneration of these neural cell types ultimately contributes to tremors or eventually muscular paralysis [1]. There is data that suggests mitochondrial dysfunction in these neurons could greatly contribute to neurodegeneration, meaning Parkinson's could be attributed to dysfunctional mitochondria, as dopaminergic neurons rely heavily on ATP for general function. A mitochondrial protein, mitoNEET, has shown some promise for being a strong target for rehabilitating mitochondrial dysfunction by several studies whose findings suggest it plays an important role in respiration efficiency [2]. I have developed a behavioral assay in which one can monitor and quantify the activity levels of *Drosophila* that have rotenone induced (sporadic) Parkinson's Disease (mitochondrial dysfunction being the root cause of Parkinson's in this case) using the DAM (*Drosophila* Activity Monitor) system and Tap Test protocols. Flies with induced PD can potentially be treated with an array of different drugs and then monitored using the DAM system protocol to observe which drugs seem to make a significant positive impact on the symptoms of PD. Looking at which drugs make an impact (drugs that bind mitoNEET vs. others) could help give important insight as to the mechanism of dopaminergic neurodegeneration due to mitochondrial dysfunction.

Funding: Institutional (WVU Departments of Biology/Neuroscience/ Pharmaceutical Science)

Program/mechanism supporting research/creative efforts: Biology 486 capstone

Poster 33

Evolution of Resistance: Exposure of *S. Cerevisiae* to Glyphosate in RoundUp

**Makala Deal,* Rachel Dacey,* Dominique Saporito,* Steven Carlson,* Apoorva Ravishankar* and
Jennifer Gallagher**

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Field (Broad Category): Biology (Sciences)

Student's Major: Biology

Herbicides applied to crops can have harmful and unintentional consequences. RoundUp is a well-known herbicide and contains the chemical glyphosate. Glyphosate resistant weeds compete with crops and understanding how these weeds become resistant can inform herbicide application practices and impact future herbicide development. *S. cerevisiae*, also called baker's yeast, is a single celled eukaryotic organism that is greatly influenced by the environmental selective pressures around it. Because yeast contain the same pathway that is inhibited by glyphosate, resistance can also develop. Glyphosate inhibits the shikimate pathway, which is responsible for producing the compound chorismate. Chorismate is converted into aromatic amino acids. Humans do not have the shikimate pathway and must obtain aromatic amino acids from their diets. In order to determine mechanisms of resistance, *S. cerevisiae*, specifically BY4741 strains were exposed to glyphosate in the lab and glyphosate-resistant yeast were isolated. In-Lab-Evolutions (ILE), consisting of serial passaging the BY4741 yeast in minimal media lacking aromatic amino acids with 0.1% glyphosate, were carried out to allow for random mutations to accumulate over time. This will create an environment where the most glyphosate resistant yeast will dominate the population. The resistant strains will be isolated, and the genomes sequenced to identify what specific genetic mutations are present that allow for this resistance. Identifying contributing genetic factors of the mechanism of resistance exhibited by yeast in the presence of glyphosate can have a significant impact on how herbicides are applied and developed in the future.

Funding: Federal (NSF MCB.1614573)

Program/mechanism supporting research/creative efforts: capstone course within my department

Poster 34

Identifying Target Genes of the Homeobox Transcription Factors Gsx1 and Gsx2 in Zebrafish

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Field (Broad Category): Neuroscience (Biology)

Student's Major: Biology

GS homeobox 1 (Gsx1), a highly conserved transcription factor, regulates the development of neurons for pre-pulse inhibition, a neurological phenomenon disrupted in schizophrenia. However, the gene network underlying the development and function of Gsx1-expressing neurons is not fully understood. Gsx1 is closely related to GS homeobox 2 (Gsx2); they have coordinate roles in interneuron development in select nervous system regions including the spinal cord and forebrain. Despite these known roles, not all Gsx1 and Gsx2 (Gsx1/2) target genes have been identified. We hypothesize that genes implicated in neurodevelopmental disorders accompanied by sensory processing deficits are likely direct and indirect targets of Gsx1/2. In silico analysis identified putative Gsx1 and/or Gsx2 binding sites upstream of 77 zebrafish orthologues of 57 putative mammalian target genes. Two candidate genes, distal-less homeobox 2a (dlx2a) and b (dlx2b), regulate inhibitory interneuron differentiation that is reported to be disrupted in NDD patients. In silico analysis identified Gsx1/2 binding sites for dlx2b and only Gsx2 binding sites for dlx2a. Whole mount in situ hybridization (WISH) identified no noticeable change in dlx2b or dlx2a expression between gsx1 mutant and wild type zebrafish, suggesting Gsx2 may sustain dlx2b expression in the absence of Gsx1, and that Gsx1 does not regulate dlx2a. Further examination of dlx2a/b expression in gsx1/2 double mutants will confirm these regulatory roles. This work will validate the conservation of mammalian Gsx1/2 target genes in zebrafish and elucidate the potential relationship between Gsx1, Gsx2, and schizophrenia-implicated genes.

Funding: Institutional (WVU)

Program/mechanism supporting research/creative efforts: Biology 486 capstone

Poster 35

Evolution of *S. cerevisiae* in the presence of Copper-Nanoparticles to develop resistance

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Field (Broad Category): Biology (Sciences)

Student's Major: Biology

Copper-Nanoparticles (CuNP) can be used in pesticides as biodegradable antimicrobials to protect crops or as an antimicrobial agent in settings where there is a sanitation need, such as on farms or in hospitals. Growth of yeast is inhibited by copper exposure in high dosages due to free radicals generated as copper interacts with water. First, we determined that resistance to CuNPs can occur through In Lab Evolutions (ILE's) where yeast are exposed to sub-lethal doses of Cu-NP. ILE passages were repeated until resistant yeast had taken over the population and single resistant colonies were isolated. Quantitative growth assays were carried out using TECAN which measures the optical density of suspected resistant colonies and control colonies grown in the presence of CuNPs. Resistant strains of yeast were then sequenced and compared to the starting yeast strain sequence to identify accumulated mutations. This experiment will help discover more about the mechanisms involved in attaining resistance to CuNP in yeast. We will prioritize known mutations in copper response genes. However, we expect novel gene mutations that affect the interaction of yeast with CuNPs, as it is hypothesized that CuNPs are more toxic than soluble copper because yeast internalize the entire CuNP. Steps were taken to limit the number of passenger mutations and possible epigenetic changes ensuring that resistant yeast possess DNA mutations conferring resistance to CuNPs. Understanding how yeast develop resistance can inform manufacturing and proper use of CuNPs to prevent microbial resistance development during normal use of novel antimicrobial materials.

Funding: Institutional (WVU Department of Biology Funding)

Program/mechanism supporting research/creative efforts: capstone course within my department

Poster 36

Genetic Variation and Hybridization in Southwestern *Rhus Integrifolia* and *R. Ovata* (Anacardiaceae)

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Field (Broad Category): Biology (Sciences)

Student's Major: Biology

Rhus integrifolia and *R. ovata* are sister species native to Southern California and the Baja California Peninsula comprising major structural components of coastal sage scrub and chaparral communities, respectively. *Rhus ovata* is also found in a similar, disjunct community (interior chaparral) in Arizona with the Sonoran and Mojave deserts separating them from the Californian populations. Both have been shown in earlier studies to hybridize, often displaying intermediate morphological characteristics. The goals of this study are to answer questions of: 1) basic evolution regarding how natural selection and gene flow interact to determine species boundaries; 2) how genetic variation is distributed over the geographic range of this species complex; and 3) how ecological niches influence morpho-genetic distinctness and hybridization. PCR reactions have been optimized for 50-100 individuals of *R. integrifolia* and *R. ovata* using PCR primers designed for a 5' untranslated region of the single copy LEAFY gene, *ndhC-trnV* and *rpl16-rps3* (two plastid spacer regions). Both plastid loci amplify consistently among accessions. PCR products will be sequenced with the same primers used for amplification at the WVU Genomics Core Facility. We expect to find a range of unique populations, in which individuals conform to parental species, and populations that show evidence of hybridization. Those individuals showing evidence of hybrid introgression are expected to have corresponding leaf morphology as well as a niche overlap between the two species. The Arizona populations of *R. ovata* are not expected to show hybrid introgression with *R. integrifolia*, as their ranges do not overlap.

Funding: Not Funded

Program/mechanism supporting research/creative efforts: BIOL 386 Biology Independent Study

Poster 37

Effects of MCHM on Cellular Processes

Hannah Layman,* Emma Alquist,* Jarred Boone,* Apoorva Ravichankar and Jennifer Gallagher

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Field (Broad Category): Biology (Sciences)

Student's Major: Biology

Thousands of gallons of 4-methyl cyclohexanemethanol were spilled; contaminating the drinking water in Charleston, WV. 4MCHM is commonly used as a frothing agent in coal cleaners, but little is known about its effects on organisms. 4MCHM has shown to cause oxidative, protein, chemical, and DNA stress in mammalian cells as well as yeast cells that share many biochemical pathways to humans. To determine what mutations can occur to confer 4MCHM resistance, In-Lab -Evolution were performed by growing yeast in the presence of MCHM. After resistance strains were isolate, the whole genome of yeast will be sequenced and analyzed. We expect that under MCHM selection yeast will become resistant to MCHM. We plan to find what specific genes confer resistance and which mutations are necessary for resistance to occur. A better understanding of MCHM and its implications on the yeast genome, such as specific mutations which helped with resistance will indicate which cellular pathways and processes are influenced and affected by MCHM. Potential effects of acute exposure could be beneficial in the case of any future events involving MCHM, as it is a major component used in an industry employing thousands who could potentially come in contact. Particularly in West Virginia, which still relies heavily on coal, it is beneficial to know about the industry, including MCHM and its interaction with cells which can provide predictions on human health.

Funding: Federal (National Institute of Health)

Program/mechanism supporting research/creative efforts: capstone course within my department

Poster 38

Nonautonomous Requirements for JNK Signaling in Thalamocortical Development

Stephany Nti,* Jessica Clemente and Eric Tucker*Rockefeller Neurosciences Institute, West Virginia University, Morgantown, WV 26506***Field (Broad Category):** Neuroscience (Health Sciences)**Student's Major:** Biology

The human brain is responsible for receiving sensory information from numerous areas of the body, interpreting that information, and guiding the body's responses. In the brain, the thalamus and cortex must communicate via axon projections to carry out these tasks. These projections are established during embryonic brain development when thalamic neurons extend axons through the forebrain and into the developing cortex in order to synapse onto their correct cortical target cells. Perturbations to this process can result in sensory processing deficits later in life, and can be associated with neurodevelopmental disorders such as autism. Our lab studies the role of the c-Jun N-terminal Kinase (JNK) pathway in early brain development, in which three JNK genes, Jnk1, Jnk2, and Jnk3 contribute. This current work utilizes a triple knockout mouse model (cTKO) to study the *in vivo* loss of Jnk1 from inhibitory forebrain neurons in a Jnk2/Jnk3 constitutive knockout background. Through immunohistochemical labeling of cTKO cortices at embryonic day 15.5 (E15.5), we have observed an overall decrease in cortical axons. We have confirmed the identity of one missing axon bundle, showing that the axons projecting from the thalamus to the cortex do not reach their targeted areas in the cortex. Instead, we have seen a thick 'U' shaped band of fibers, suggesting a possible misrouting of thalamocortical axons. This study shows, for the first time, a role for JNK signaling in thalamocortical development, which takes us one step closer to understanding how different brain regions can indirectly impact all of brain development.

Funding: Federal (NIH Grant R01 NS082262-01)**Program/mechanism supporting research/creative efforts:** Biology 386 and volunteer**Poster 39**

Investigating the role of Fanconi Anemia pathway in response to Oxidative Stress

Zachary N. Sherman,* Jian Xu, Allison Cole and Wei Du*Department of Pharmaceutical Sciences, West Virginia University, Morgantown, WV 26506***Field (Broad Category):** Pharmaceutical Sciences (Health Sciences)**Student's Major:** Biology

Fanconi Anemia (FA) is a rare inherited disease associated with bone marrow failure (BMF) and high risk of developing myelodysplasia syndrome and acute myeloid leukemia. It is genetically heterogeneous with at least 22 genes (FANCA-W) identified thus far. It has established a DNA damage repair-based pathway, in which 8 of FA proteins form a nuclear core complex. This core complex is required for mono-ubiquitination of FANCD2-FANCI dimer upon DNA damage. Mutation in any 22 FA genes leads to such clinical symptoms manifested by developmental abnormalities, BMF and leukemia. To further understand the role of FA proteins in response to oxidative stress (OS), which acts as both physiological and pathological cues for the cells, I cultured healthy donor or patient-derived lymphoblast cell lines, namely HSC93, HSC72, HSC536 in supplemented media. First, I monitored the cell growth by counting them daily for constitutively 5 days and plotted a cell growth curve. To detect OS-induced DNA damage response in normal and FA cells, I treated HSC93, HSC72, HSC536 cells, and the corrected HSC72+FANCA, HSC536+FANCC cells with H₂O₂. I extracted whole cell lysates from cells treated and untreated with H₂O₂ using a RIPA buffer / protease inhibitor cocktail. I then loaded protein lysates to western blot gels for visualization. I expect to see OS-induced FANCD2 mono-ubiquitination in normal HSC93, corrected HSC72+FANCA and HSC536+FANCC cells but not in FANCA or FANCC deficient HSC cells. The results gained from my experiments will shed light on understanding the role of FA pathway in response to outside stresses.

Funding: Federal (NIH/NIGMS Sciences & West Virginia Clinical and Translational Science Institute)**Program/mechanism supporting research/creative efforts:** WVU's Research Apprenticeship Program

Poster 40

Assessing Protein Quality and Safety of Carp-Derived Protein Sources Using Growing Female Sprague-Dawley Rats

Lynsey Soule,* Derek Warren, Chris Skinner, Kriten Matak and Janet Tou

Davis College of Agriculture, Natural Resources, and Design, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Human Nutrition and Foods (Agriculture/Natural Resources)

Student's Major: Biology

Demand for protein supplements is increasing as populations grow and resources become limited. Using fish processing byproducts, such as sarcoplasm, can increase sustainability as well as benefit the environment. Silver Carp is an invasive species in the US and due to its abundance provides a sustainable protein source. The objective of this study was to evaluate the protein quality of carp sarcoplasmic protein as well as safety for human consumption. Female Sprague-Dawley rats were randomly assigned to four diet groups, consisting of: 1) fish processing byproduct protein (carp sarcoplasmic protein), 2) whey, 3) casein for 4 weeks or 4) a casein diet for 2 weeks followed by a protein-free diet for 2 weeks. The study results showed no significant differences in protein quality measurements of true digestibility, biological value or protein digestion corrected for amino acid score (PDCAAS). PDCAAS is used to measure protein value on Nutrition Facts label while protein efficiency ratio (PER) is used to determine the ability of protein to support growth and to measure protein value on infant formulas. PER was higher for whey protein (2.64 ± 0.10) than carp protein (0.83 ± 0.27). However, rats fed whey also had significantly higher gonadal adipose tissue mass compared to the other protein groups. Significant changes in organ weight used as an indicator of toxicity showed no significant differences in liver, heart, kidneys, brain, and spleen among diet groups. Based on the results, carp sarcoplasmic protein quality is like casein and safe for human consumption.

Funding: Federal (United States Department of Agriculture)

Program/mechanism supporting research/creative efforts: Biology 486 capstone

Poster 41

Co-crystallization of mitoNEET with Thiazolidinediones

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Field (Broad Category): Biochemistry (Sciences)

Student's Major: Biology

MitoNEET is a mitochondrial surface protein notable for its iron-sulfur center. Although mitoNEET's exact function is unknown, previous studies have shown that it binds thiazolidinediones, a class of insulin sensitizing drugs, thereby implicating it as a possible target for diabetes treatment. We sought to co-crystallize mitoNEET with different thiazolidinediones and their analogues to reveal the structural basis of protein-drug binding affinity. His-SUMO-mitoNEET was overexpressed in cells and purified using a nickel agarose column. The tag was cleaved off using SUMO protease. Purified mitoNEET was bound to ligands and screened in a 96 condition matrix and optimized for protein crystallization. Micro-seeding and soaking techniques were also tested as ways to bind drugs to mitoNEET. Crystals were diffracted using the Advanced Photon Source at Argonne National Laboratory. We obtained atomic level resolution ($< 2.3 \text{ \AA}$) revealing how drugs coordinate to this exciting target. Using the structure as a "molecular road map" we are currently testing our hypothesis of drug-protein coordination by site specific mutagenesis.

Funding: Federal

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Molecular Biology & Biochemistry

Poster 42

Acute Vascular Effects of Nicotine vs. No Nicotine in E-cigarette Vapor

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Field (Broad Category): Exercise Science/Physiology (Health Sciences)

Student's Major: Exercise Physiology

Recent data shows electronic cigarettes (e-cigs) exposure can impair endothelium dependent dilation in blood vessels. Nicotine is a known vasoconstrictor so we hypothesize that e-cig vapor with nicotine will result in greater endothelial dysfunction compared to same vapor without nicotine. Mice were anesthetized using Inactin via intraperitoneal injections. The gluteus maximus was partially externalized and incubated in a warmed bath containing physiological saline solution. Vessel diameters were measured in triplicate and average value used for data analyses. Following e-cig vapor exposure there was steady decline in vessel diameter in both groups, however the no nicotine group show greater declines (9%, 18% and 23% reduction @ 15, 30, 60 mins, respectively) compared to the nicotine group (2%, 12% and 8% reduction @ 15, 30, 60 mins, respectively) (repeated measures ANOVA Group x Time interaction, $p < 0.001$). Contrary to our hypothesis, we found that e-cig vapor with no nicotine resulted in greater levels of vasoconstriction compared to similar e-cig vapor from liquid containing 18mg/ml of nicotine. The explanation for this response is not presently known, however nicotine has sympathomimetic affects that might help explain this observation. Based on these data, e-cigs vapor without nicotine should not be consider 'safe' or even 'safer'.

Funding: Institutional (WVU HSC SOM Bridge Funds)

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 43

Effects of N-methyl-3-(3,4-dichlorophenyl) propanamide (N-MeDCPA) treatment on T cell cytokine production

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Field (Broad Category): Immunology (Health Sciences)

Student's Major: Immunology and Medical Microbiology

N-methyl-3-(3,4-dichlorophenyl) propanamide (N-MeDCPA) is a haloanilide compound that inhibits the Orai calcium (Ca^{2+}) channel. Normal bone dynamics require a balance between bone production by osteoblasts and bone removal by osteoclasts. The differentiation of monocytes to osteoclasts requires extracellular Ca^{2+} influx. We hypothesize that N-MeDCPA can be used to control bone erosion caused by excess osteoclast activity associated with arthritis. T cells also require Ca^{2+} influx for activation. Thus, raising the concern that in vivo treatment using N-MeDCPA could also inhibit essential T cell functions. To explore the effect of N-MeDCPA on T cells, we first determined the in vitro effects of the N-MeDCPA on splenic T cell cytokine production. Our in vitro results showed that N-MeDCPA decreased T cell cytokine production in a dose-dependent manner. Ongoing follow up in vivo studies will evaluate blood drug concentrations to correlate N-MeDCPA blood levels with concentrations shown in vitro to inhibit T cell cytokine production. For these studies, we evaluated serum N-MeDCPA concentrations by mass spectrometry after intraperitoneal or oral administration of N-MeDCPA in DBA/1J mice. Future studies will compare N-MeDCPA in vivo doses shown to control osteoclast activity with those known to inhibit T cell activation as measured by cytokine production. Initial evaluation of N-MeDCPA suggest that it may be a promising novel therapeutic in autoimmune diseases.

Funding: Institutional (West Virginia University)

Program/mechanism supporting research/creative efforts: IMMB internship program

Poster 44

Ensuring Quality Patient Care Through Cortisol Reference Interval Evaluation

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Field (Broad Category): Laboratory Science (Health Sciences)

Student's Major: Medical Laboratory Science

Cortisol is the body's main "stress hormone." Cortisol shows a diurnal variation throughout the day; it is increased in the morning and decreased in the afternoon. Measurement of cortisol can be extremely important in diagnosing a multitude of endocrine disorders, particularly Cushing's Disease and Addison's Disease. Since reference intervals can vary between sex, age, and geographical regions, it is very important for clinical laboratories to set their own reference intervals or validate reference intervals from the manufacturer. When clinical laboratories set reference intervals, a 95% confidence interval is to be achieved to encompass the entire "healthy" population. In this study, we took 813 cortisol results from J.W. Ruby Memorial Hospital in 2016 and 2017. The results were sorted based on time of collection to reflect the diurnal variation of cortisol, 0700-1000 and 1500-1800. The 95% confidence level was calculated using Excel®. After preliminary calculations, all patients with a known disease that would affect cortisol levels were excluded. The 95% confidence level was calculated again, on the selected population, to obtain a true 95% confidence on a healthy population. The distribution between the preliminary calculations, before exclusions, and the selected population were vastly different compared to one another. The distribution went from bimodal to a normal distribution in both the morning and evening calculations because 254 low results were excluded because of clear disease association. The research showed a possibility of not changing the reference interval for cortisol.

Funding: Not Funded

Program/mechanism supporting research/creative efforts: capstone course within my department

Poster 45

The Effects of Sirtuin-1 Expression on Metabolic Pathways.

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Field (Broad Category): Exercise Science/Physiology (Health Sciences)

Student's Major: Exercise Physiology

Sirtuin-1(Sirt-1) has been identified as a protein associated with metabolic processes. Amongst those it is most commonly referenced in adipose build-up(Obesity), cancer, and inflammatory responses. Its role in the human body is not fully known, and few studies have been conducted to identify its true role in the metabolic pathways. In more recent studies associations between Sirt-1 and glucose are beginning to surface. The aim of this study is to observe the Sirt-1 effects upon the metabolic systems in both obese mice as well as lean mice. The study's most specific focus is upon Sirt-1's role in glucose metabolism as well as the tolerance levels of glucose with and without sirt-1's abundance. This was accomplished through Immunohistochemical analysis of pancreatic tissue samples taken from experimental groups of mice actively expressing the gene and mice who lack the gene. The results of the study are not yet definitive. However, preliminary data supports that Sirt-1 has a positive correlation with higher tolerance of glucose in mammals actively expressing the gene as compared to mammals that lack the gene.

Funding: Institutional (West Virginia University)

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 46

An Examination of Chemotherapy Induced Peripheral Neuropathy (CIPN) in Patients Undergoing Breast Cancer Treatment

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Field (Broad Category): Exercise Science/Physiology (Health Sciences)

Student's Major: Exercise Physiology

Chemotherapy Induced Peripheral Neuropathy (CIPN) is a condition associated with administration of taxanes, a drug that has achieved successful outcomes in the treatment of metastatic breast cancer. It has been estimated that 57% to 83% of patients, receiving various formulations of the taxane drug, experience moderate to severe symptoms of distal pain, paresthesia, hypoesthesia, proprioceptive loss, muscular weakness, loss of balance, muscle atrophy, and decreased quality of life. One of the aims of this study was to quantify motor unit (MU) behavior as related to the duration and post-infusion treatment period for up to one year. To accomplish this aim, electromyographic (EMG) measurements were synced with static and dynamic balance and gait measurements. The Delsys Trigno wireless system was used to measure electrophysiological behaviors of selected muscles in quiet stance and during perturbations using a NeuroCom Smart Balance system. The GaitRite Walkway system measured relationships between gait and neuromuscular behavior. Muscles selected for assessment were tibialis anterior, peroneus longus, and the medial and lateral heads of the gastrocnemius. Individual MU action potentials were monitored using the Delsys decomposition EMG system (dEMG). The first dorsal interosseous muscle was selected for observation of changes in the distal superior extremity with ongoing taxane infusions. This descriptive study is approved by the Cancer Center Disease Team, Protocol Monitoring and Review Committee of the School of Medicine and the Institutional Review Board. All patients' information is kept confidential to ensure safety and privacy.

Funding: Not Funded

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 47

Inhibition of Sterol and Lipid Synthesis Mediates Anti-leukemic Effects in B-cell Acute Lymphoblastic Leukemia

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Field (Broad Category): Biochemistry (Health Sciences)

Student's Major: Biochemistry

To address the clinical challenge of disease relapse in leukemic patients, initiated by the presence of minimal residual disease that are refractory to treatment within the bone marrow microenvironment, we have developed a co-culture model that mimics that unique anatomical site. Using this model that includes primary human derived marrow cells, we have isolated and characterized the leukemic cell populations that are resistant to drug therapy. Our observations suggest that chemotherapy resistant tumor cells have increased activation of protein kinase B (AKT) and a coincident inhibition of AMPK. Since AMPK is a negative regulator of sterol synthesis and fatty acid oxidation, we investigated the role of these pathways in contributing to survival of leukemic cells. We found that inhibition of HMG-CoA-reductase, a critical modulator of sterol synthesis, induced concentration-dependent cell death in B-cell acute lymphoblastic leukemia (ALL) cells. However, inhibition of ATP-citrate lyase, a modulator of fatty acid synthesis, did not have any anti-leukemic effects in ALL cells. Interestingly, combined inhibition of HMG-CoA-reductase and ATP-citrate lyase had an additive effect on inhibition of Bcr-Abl Ph+ ALL cell proliferation. Taken together, this study suggests therapeutic value of inhibition of sterol and fatty acid synthesis in mediating anti-leukemic effects in ALL. This unique combination may provide a novel approach to reducing minimal residual disease and subsequently lowering the likelihood of relapse of aggressive ALL.

Funding: Institutional (Alexander B. Osbourn Endowment)

Program/mechanism supporting research/creative efforts: a WVU 497-level course

Poster 48

Metabolic Profile of Thyroid Eye Disease

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Field (Broad Category): Biochemistry (Health Sciences)

Student's Major: Biomedical Engineering

Thyroid Eye Disease (TED), also known as Graves' eye disease, is an autoimmune condition in which the eye muscle and the connective tissue within the eye socket are attacked by the autoimmune system in response to excessive thyroid hormone. However, the biochemical mechanisms causing eye tissue vulnerability and how the disease is developed are still unclear. This project utilizes state-of-the-art metabolomics to investigate the biochemical basis of TED by studying eye tissue from TED patients. Eye muscle and connective tissue samples (separated into a normal group and patient group) were obtained from human patients at the West Virginia University Eye Institute. The metabolites were extracted from these tissues and quantified by metabolomics targeting over 120 major metabolites. The data were analyzed by both multivariate and univariate analysis. Analysis showed that the metabolic profile was significantly different between the normal and patient samples in score plots. Strikingly, many purine metabolites were accumulated in the patient samples. Additionally, the antioxidant glutathione was about half in TED samples. In conclusion, purine metabolic pathway is activated in the TED eye tissue, indicating a potential missing link between hyperthyroidism and TED.

Funding: Institutional (WVU Startup Fund, NIH RO1, Brightfocus Foundation)

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 49

Feeding apple pomace changes liver lipid metabolism in young female Sprague-Dawley rats

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Field (Broad Category): Human Nutrition and Foods (Health Sciences)

Student's Major: Chemical Engineering

Apple pomace is a waste byproduct of apple processing that is high in nutrients and bioactive compounds including: polyphenols, pectin, insoluble fibers, and fructose. These compounds may have potential to either improve or to promote metabolic conditions such as non-alcoholic fatty liver disease (NAFLD). NAFLD is the most common chronic liver disease in Western countries and has been linked to a high fat, high sugar (Western) diet. The objective of this study was to determine the effects of apple pomace supplementation on hepatic lipid metabolism since changes contribute to development of NAFLD. Young (age 22-29 days) female Sprague-Dawley rats were randomly assigned (n=8 rats/group) to four diet groups consisting of 1) a standard purified rodent diet (AIN-93G), 2) AIN93G + 10% kcal apple pomace, 3) a Western (45% fat, 33% sucrose), and 4) Western + 10% kcal apple pomace for 8 weeks. Hepatic histological evaluation showed Western rats had the highest fat infiltration with Western + apple pomace showing a decrease in fat deposition. Gene expression of hepatic lipid metabolism by real time quantitative polymerase chain reactions (RT-qPCR) showed that expression of genes involved in lipolysis was not significantly different among the four diet groups. However, RT-qPCR showed Western rats had increased (p<0.05) expression of lipogenic gene, diacylglycerol O-acyltransferase 2 (DGAT2) compared to Western + apple pomace diet. DGAT2 catalyzes the last step of triglyceride synthesis and has been linked to hepatic fat deposition. These results indicate that apple pomace supplementation attenuates hepatic steatosis induced by consuming a Western diet.

Funding: Institutional (Davis College of Agriculture, Natural Resources, and Design)

Program/mechanism supporting research/creative efforts: WVU's SURE Program

Poster 50

Conditionally dependent production of ergot alkaloids by ecologically diverse *Metarhizium* species

Caroline E. Leadmon,* Jessi K. Tyo,* Angie M. Macias, Matthew T. Kasson and Daniel G. Panaccione
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Field (Broad Category): Biochemistry (Agriculture/Natural Resources)

Student's Major: Biochemistry

Ergot alkaloids are important agricultural and pharmaceutical chemicals. Publicly available genomic sequence data indicate that fungi in the genus *Metarhizium* have the capacity to produce lysergic acid-derived ergot alkaloids; however, accumulation of ergot alkaloids in these fungi has not been demonstrated previously. *Metarhizium* species colonize soil, roots of many plants, and insects. Because of these properties, some *Metarhizium* species are used as biocontrol agents. We investigated several *Metarhizium* species grown under different conditions for accumulation of ergot alkaloids by high performance liquid chromatography with fluorescence detection. *Metarhizium flavoviride* did not accumulate ergot alkaloids on any of three culture media, but *Metarhizium anisopliae* accumulated large quantities of the ergot alkaloids lysergic acid α -hydroxyethylamide (LAH), ergine, ergonovine, and chanoclavine-I on sucrose yeast extract agar, lesser quantities on malt extract agar, and none on corn meal agar. The identities of the alkaloids were confirmed by mass spectrometry. Interestingly, *M. anisopliae* secreted over 80% of its alkaloid yield into the medium, whereas ergot alkaloids of other fungi are retained in their hyphae. We inoculated roots of corn (*Zea mays*), bean (*Phaseolus vulgaris*), and *Medicago truncatula* with *M. anisopliae* and *M. flavoviride*, and no ergot alkaloids were produced by either fungus on any plant. Four of five tested *Metarhizium* species produced high concentrations of ergot alkaloids in infected larvae of the model insect *Galleria mellonella*. The data demonstrate that several *Metarhizium* species produce ergot alkaloids of the lysergic acid amide class and that production of ergot alkaloids is tightly regulated and associated with insect colonization.

Funding: Federal (NIH)

Program/mechanism supporting research/creative efforts: WVU's SURE Program and Agbio 386

Poster 51

The Antibody Response to Whole Cell and Acellular vaccines against *Pseudomonas aeruginosa*

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Field (Broad Category): Immunology (Health Sciences)

Student's Major: Immunology and Medical Microbiology

The Gram-negative bacterium *Pseudomonas aeruginosa* is an opportunistic pathogen that causes myriad infections in immunocompromised individuals. *P. aeruginosa* airway infections in patients with compromised immune systems (such as individuals afflicted with Cystic Fibrosis) can cause complications such as acute and chronic pneumonia and are the leading cause of death in Cystic Fibrosis patients. Presently, there is scarce healthcare relief due to the intrinsic antibiotic resistances of the pathogen. Consequently, our laboratory studies the use of vaccines as an alternative to antibiotic treatment. Whole Cell Vaccines are highly efficacious but produce adverse side effects. We have developed an acellular vaccine that targets surface proteins of *P. aeruginosa* as the active antigen. While we know that it can help protect mice against *P. aeruginosa* infections, we do not fully understand the mechanism of protection for this vaccine. Proteins produced by immune cells, called antibodies, help mediate the immune response and assist with recognition and clearance of the pathogen. Utilizing a mouse model of *P. aeruginosa* vaccination and challenge, we have tested the vaccine and analyzed its efficacy via ELISA serological assays, assessing levels of specific antibody response. The assays we performed confirmed the presence of antibodies against the antigens present in the acellular vaccine, and against the pathogen. Our results indicate that various types of antibodies are produced as a result of vaccination. It is likely that these antibodies are involved in acellular vaccine efficacy and assist the murine immune system to adequately protect the host from acute infections of *Pseudomonas aeruginosa*.

Funding: Private (Cystic Fibrosis Foundation)

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 52

Generation of Patient-derived Xenografts (PDX)s as a Renewable Resource to Study Appalachian HNSCC

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Field (Broad Category): Biology (Health Sciences)

Student's Major: Pre-pharmacy

Head and neck squamous cell carcinoma (HNSCC) is a highly invasive cancer, with a 5-year survival rate of 40%. HNSCC is primarily caused by tobacco and/or associated alcohol consumption, or by infection with human papilloma virus (HPV). In Appalachia, male patients die sooner with HPV-negative HNSCC, making this a health disparity. In order to evaluate HNSCC in long-term biological studies, tumor tissue can be propagated by creation of patient derived xenografts (PDXs). For this purpose, primary patient tissue is implanted into the flanks of immunodeficient mice and tumors are allowed to grow to 1 cm³. Animals are then euthanized, and the tumor is surgically removed and processed for downstream applications. These include sectioning for histological evaluation, cryopreservation, derivation of primary cell lines, and further passaging into additional mice for tissue expansion. Histological evaluation requires sectioning of FFPE blocks and staining with hematoxylin and eosin (H&E) stain to compare the PDX to primary patient tumors. Passaged PDX tissues prove to be similar in structure to the parent patient tissue from which they were derived, supporting the use of PDX tumors as a useful tool for studying the mechanisms of HNSCC progression. Cell lines derived from PDX tumors also exhibit invasive properties similar to those observed in patients as identified through degradation of a pseudo-basement membrane comprised of fluorescent gelatin. Treatment of primary cells with an anti-cancer drug revealed a decrease in gelatin degradation, further demonstrating the utility of PDX technology in pre-clinical investigation of potential treatment methodologies for HNSCC patients.

Funding: State (CTSI)

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 53

The Inferences from Recent Dengue and Zika Virus Outbreaks

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Field (Broad Category): Civil/Environmental Engineering (Engineering)

Student's Major: Civil and Environmental Engineering

Dengue and Zika viruses are increasingly becoming global health threats. With a recent resurgence of Zika virus in Latin and South America, there is a renewed interest to understand the physical pathways between the interactions of vectors and the human population. *Aedes spp.* mosquitoes are the primary vector for both dengue and Zika viruses. In order to understand how one species of mosquito is able to transmit these two diseases at once, further investigation must go into the co-emergence behavior of dengue and Zika infections. This project looks at the emergence of Zika virus in South America and compares it to the fluctuation of dengue cases over the same time-period. Zika virus infections occurred in areas already infected with dengue, emerging when the area was experiencing a dengue outbreak. Additionally, these results can be used concurrently with the environmental, climatological, and hydrological conditions believed to influence mosquito populations to better aid in the prediction of the spread of Zika virus.

Funding: Federal (NASA)

Program/mechanism supporting research/creative efforts: NASA WVSGC Undergraduate Research Fellowship Program

Poster 54

A Role for Tumor Macrophage-Derived Microvesicles in Regulation of Epithelial-to-Mesenchymal Transition

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Field (Broad Category): Immunology (Health Sciences)

Student's Major: Immunology and Medical Microbiology

Macrophages are classified into two populations: M1, pro-inflammatory and anti-tumor to support cytotoxic T cell function, and M2 which suppress immune cell killing and support angiogenesis and progression. Genes involved in Epithelial-to-Mesenchymal transition (EMT) regulate tumor cell plasticity and dictate metastasis while GRHL transcription factors suppress EMT. We investigated a role for macrophage-secreted microvesicles (MVs) to modulate EMT. Our data suggests that MVs derived from M1 and M2 macrophages are taken-up and disparately induce GRHL1/2 mRNAs expression in mammary epithelial and breast cancer cells. Surprisingly, we found that M2 MVs are protective against EMT in mammary epithelial cells by augmenting GRHL1/2 expression and suppressing cell migration, but not protective in breast tumor cells where it was M1 MVs which played the suppressive role. These data suggest that M2 macrophages may play a protective role against initiation of EMT while M1 macrophages may induce reversal of EMT in established breast tumors. These novel finding shed some light on the understanding of the role on M1/M2 macrophages microvesicles in their role in cancer progression.

Funding: Federal (WVCTSI start-up funds U54GM104942 to T.D.E and NCI R01 CA194013-01 to T.D.E)

Program/mechanism supporting research/creative efforts: IMMB Scholarship

Poster 55

The Vast Potential of Zebrafish in Developmental Neuroscience Research

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Field (Broad Category): Biology (Sciences)

Student's Major: Biochemistry

Zebrafish are gaining popularity in biomedical research laboratories due to various benefits. These vertebrates are ideal models for studying genetic control of early development of the central nervous system because it develops and begins to function within just 24 hours. Additionally, zebrafish share approximately 70 percent of their genetic information with humans, with roughly 84 percent of human disease-related genes having a zebrafish ortholog. Zebrafish share analogous brain structures that function similarly to those in mammals, such as the hypothalamus which regulates hormone expression, stress, and reproduction. Zebrafish facilities are also cost-efficient, as adults can be well-maintained in limited spaces. Hundreds of eggs can be obtained from one female in a single spawning, providing an abundance of data. Additionally, the embryos are fertilized externally, allowing us to manipulate them as early as the one-cell developmental stage. Zebrafish embryos are transparent, enabling them to be easily examined through a simple light microscope. This transparency allows for the study of expression of specific genes and proteins to elucidate their roles in various developmental processes. One technique used to study development at a gene-expression level in zebrafish is in situ hybridization, a procedure which targets RNA to reveal when and where genes are expressed. For example, *gsx2*, a gene previously undocumented in zebrafish, has been shown by our lab to first be expressed in the forebrain. Zebrafish hold great potential for advancing medical research and may be the key to better understanding the genetic and environmental mechanisms underlying some neurodevelopmental disorders in humans.

Funding: Institutional (WVU Work-Study Program)

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 56

Efficacy of Ultraviolet Germicidal Irradiation for inactivating *Candida auris*, a multi-drug resistant pathogen

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Field (Broad Category): Biology (Health Sciences)

Student's Major: Exercise Physiology

Candida auris is a multi-drug resistant fungal pathogen that is emerging within the U.S. healthcare sector. As of January 23, 2018, 228 cases have been reported in 10 states. This fungal species primarily affects immunocompromised patients and has a mortality rate of 60%. Daily and terminal disinfection strategies to inactivate *C. auris* have only recently been studied. In this pilot study, we investigate the efficacy of Ultraviolet Germicidal Irradiation (UVGI), a disinfection strategy that is becoming more commonly utilized in the healthcare sector. *C. auris* was cultured and exposed in liquid suspension to UVGI with doses ranging from 0 mJ/cm² to 300 mJ/cm². After exposing *C. auris* cells to UV energy with a wavelength of 254 nm, the suspension was grown on agar media and the viability calculated. There has been a consistent 99.999% reduction in viability using a UV dose of 84.02 mJ/cm². These pilot data demonstrate the feasibility of UVGI methods to inactivate *C. auris* in US healthcare environments.

Funding: Federal (Work Study Program)

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 57

Comparative analysis of broccoli by-products for human nutrition: the potentials of by-product utilization

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Field (Broad Category): Agriculture (Agriculture/National Resources)

Student's Major: Biochemistry

In the year 2015, broccoli production in the U.S. reached 17.6 million tons but only 10% of the total aerial biomass of broccoli plant is utilized for consumption. In this study, human nutritional potential of pesticide-free broccoli tissues such as florets, stems, and leaves were compared to evaluate the value of stem and leaf by-products as an important source of essential nutrients. Primary metabolites, glucosinolates, carotenoids, chlorophylls, vitamins E and K, essential minerals, total phenolic content, antioxidant activity, and gene expression of glucosinolate biosynthesis and hydrolysis were quantified from different broccoli tissues. Broccoli florets had higher concentrations of amino acids, glucoraphanin, and neoglucobrassicin compared to the other two tissues, whereas leaves were the highest in carotenoids, chlorophylls, vitamins E and K, total phenolic content, and antioxidant activity. Leaves were also found to be good sources of calcium and manganese compared to other tissues. Stem had the lowest nitrile formation from glucosinolate. The comprehensive nutrients and bioactive compounds profile that have been acquired from this study would be useful for further broccoli by-product utilization as part of the human diet.

Funding: Federal (NIFA)

Program/mechanism supporting research/creative efforts: Voluntary efforts

Poster 58

Stroke Project

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Field (Broad Category): Neuroscience (Health Sciences)

Student's Major: Nursing

Acute ischemic stroke (AIS) is the leading cause of disability and fifth leading cause of death in the United States. AIS occurs when any vessel in the brain is blocked, causing a lack of blood flow. This causes a deprivation of oxygen and glucose to the brain tissue. If blood flow is not quickly restored to the affected tissue, it will die, and trigger an immune response. The immune cells travel to the brain to prevent extensive damage and clean up dead cells. This action can prevent the amount of harm that occurs. However, if there is an over active immune response, this can cause more harm to the brain. There is currently a constricted understanding of this immune response and what differentiates a helpful versus harmful response. Right now, there is only one FDA-approved drug to treat AIS, tissue plasminogen activator (tPA) but only four percent of patients are eligible to use it. Therefore, developing new treatments is vital and targeting the immune response could be a promising strategy. Our current project is determining if the neutrophil-lymphocyte ratio (NLR) can be used to predict the outcome of AIS. Neutrophils are the first immune cells to arrive to the brain following AIS and lymphocytes are immune cells that arrive after the initial immune response. While our project is presently incomplete, preliminary results show an elevated NLR correlates with a poor AIS outcome. With the results of this project, physicians can predict a more accurate prognosis and treatment plan.

Funding: Institutional

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 59

Apple Pomace Supplementation Had No Detrimental Effects on Bone Indices in a Rat Model

Kathryn M.E. Taylor,* R. Chris Skinner, and Derek Warren and Janet Tou

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Field (Broad Category): Human Nutrition and Foods (Agriculture/Natural Resources)

Student's Major: Biochemistry

Apple pomace is a waste product of apple processing and presents an environmental pollutant due to the cost of disposal. Yet, apple pomace is a rich source of various nutrients leading to interest in its development as a dietary supplement for human consumption. Apple pomace is high in calcium but is also rich in fructose which reduces calcium absorption. This has important implications since low dietary calcium intake during growth has been associated with osteoporosis. Another dietary contributor to bone loss are diets high in fat and sugar typified by the Western diet. The objective of the study was to determine if feeding growing animals diets supplemented with apple pomace affects bone growth, mineralization, and bone strength. Young (age 22-29 days) female Sprague-Dawley rats were randomly assigned (n=8 rats/group) to four diet groups consisting of 1) a standard purified rodent diet (AIN-93G), 2) AIN-93G + 10% kcal apple pomace, 3) a Western (45% fat, 33% sucrose), and 4) Western + 10% kcal apple pomace for eight weeks. Morphometry of the femurs indicated no significant difference in femur mass, length, width, and depth. Femur calcium content determined by inductively coupled plasma optical emission spectroscopy showed no differences (p=0.75) among dietary groups. Bone strength determined by three-point bending test also showed no significant differences among diet groups. Based on the results, apple pomace supplementation had no detrimental bone effects suggesting it is safe for consumption. This is significant since apple pomace is currently being developed for commercial use as a prebiotic.

Funding: Institutional (Dean Daniel J. Robinson)

Program/mechanism supporting research/creative efforts: a WVU 497-level course

Poster 60

Functional analysis of a gene involved in synthesis of fungal lysergic acid amides

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Field (Broad Category): Biochemistry (Agriculture/Natural Resources)

Student's Major: Biochemistry

Ergot alkaloids are chemicals that are produced by certain fungi and are important in agriculture and medicine. Many important ergot alkaloids are lysergic acid amides, such as ergonovine and lysergic acid alpha-hydroxyethylamide (LAH). The pathway to create ergonovine is established, but the pathway from lysergic acid to LAH is unknown. Based on genome sequence comparisons we hypothesized that a flavin-containing monooxygenase gene (*easO*) was involved in the production of LAH. Using PCR methods, we prepared a gene knock out construct and introduced it into the LAH-producing fungus *Metarhizium anisopliae* by protoplast transformation. Four independent knock outs were identified by PCR strategies that showed the knock-out construct had integrated into the *easO* locus. High performance liquid chromatography and mass spectrometry analyses demonstrated that the knock-out fungal strains lacked LAH and retained ergonovine. The data supported our hypothesis that *easO* was involved in the production of LAH. The roles of these ergot alkaloids in fungal virulence to larvae of the insect species *Galleria mellonella* was also tested. Ergonovine-accumulating *easO* knockout strains killed larvae significantly faster than the LAH-accumulating wild type ($p < 0.0001$); however, the *easO* knockout fungus rarely emerged from dead larvae, whereas the wild-type fungus sporulated profusely on larval cadavers. These data indicate that ergot alkaloids play a major role in the interaction of *M. anisopliae* with insects. An understanding of the production of lysergic acid amides is beneficial because of their role in insect pathogenesis and because of the medical uses of lysergic acid derivatives.

Funding: Federal (NIH)

Program/mechanism supporting research/creative efforts: Other

Poster 61

Isolation and Functional Study of Lipophorin Receptors in the Beetle Horn Development

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Field (Broad Category): Biochemistry (Agriculture/Natural Resources)

Student's Major: Biochemistry

The focus of this ongoing research is to understand the genetic mechanisms by which environmental inputs facilitate morphological change, as well as how organisms may have acquired such response to the environment during their evolution. Dung beetles (genus *Onthophagus*) serve as models to study these fascinating biological questions since the morphology of their horn changes in response to nutritional input received during the larval stages of their development. Our previous research showed that genes that have critical roles in cell differentiation/proliferation were also responsible for the regulation of horn growth in beetles. However, the genetic mechanisms by which nutritional input regulates expression of such genes is not yet known. In this research, we focus on lipid metabolism/transportation as a function of nutritional input in the beetles. We have been investigating the significance of cholesterol transportation in beetle horn development, because two of the gene products mentioned above (Hedgehog and Smoothed) require cholesterol modification to fully express their function. Specifically, we study the function of the gene *lipophorin* receptor (*lpr*), as to understand how beetles transport lipids, such as cholesterol (as a form of lipophorin, an equivalent of human HDL). We will present our current data on the isolation of *lpr* and functional analysis of it via RNA interference. This study will highlight the significance of a rather largely ignored aspect of nutrition, lipid, in the development of insects.

Funding: Institutional (WVU)

Program/mechanism supporting research/creative efforts: WVU's SURE Program, AGBI 497 Independent Research, Voluntary efforts

Environmental Sciences Category

Poster 62

Effects of long-term Nitrogen Deposition on the Composition and Function of Soil Microbial Communities

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Field (Broad Category): Biology/Ecology (Sciences)

Student's Major: Biochemistry

Through the use of nitrogen-based fertilizers and the burning of fossil fuels, human activities have led to an increase in bioavailable nitrogen. In the absence of human N input, tree growth is limited by the availability of nitrogen in soil. To increase access to soil nitrogen, trees send sugar subsidies to associated soil microbes, and in return, the microbes use this added energy to make enzymes that breakdown N-bearing substrates in the soil and enhance N uptake by the plant. When N is enhanced by human inputs, plants may reduce or shut down this pathway, altering microbial composition and function in the soil. The end result of this weakened pathway may be a decrease in the amount of CO₂ that soils release, thereby slowing global change. Here, we describe the impact of increased nitrogen availability on forest soils, specifically whether weakening of the plant-microbe pathway has impacted the identity and function of soil fungi and bacteria. We conducted microbial community (metagenomic) and gene expression (metatranscriptomic) analyses under both natural and experimentally elevated nitrogen conditions of forest soils at the Bear Brook Watershed (Maine, USA). The results indicate significant shifts in bacterial community composition, in addition to shifts in the expression levels of genes related to nitrogen and carbohydrate metabolism, suggesting that the bacterial community plays an important role in below-ground responses to N fertilization. Collectively, this work suggests that shifts in the identity and function of soil microbes due to human N inputs may enhance soil carbon storage.

Funding: Not Funded

Program/mechanism supporting research/creative efforts: capstone course within my department

Poster 63

Characteristics of Filter Socks on Unconventional Well Sites in West Virginia

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Field (Broad Category): Natural Resources/Wood Science/Plant Science (Agriculture/Natural Resources)

Student's Major: Energy Land Management

Filter socks have come into wide use in oil and development activities in the Appalachian Basin as an erosion and sediment perimeter control technique. Filter socks are a contained filter berm constructed of a biodegradable mesh tube filled with a filtering media. Specified use of composted materials during construction of filter socks has created inefficiencies during well site construction. Typically, during clearing and grubbing of a well pad site, discarded trees and tree tops are chipped on site and temporarily stockpiled. Then, composted chips are hauled onto well sites and used to fill filter socks during erosion and sediment control measures installation. The use of chips created on site, instead of hauling composted chips from supply yards, could reduce energy/capital costs, truck traffic, and disposal costs for woody material generated on site. The primary objective of this research project is to describe the characteristics of filter sock use on unconventional well sites in West Virginia. Using well development data supplied by industry partners metrics were developed for the average area of disturbance for unconventional well sites including the area cleared as well as the total quantity and characteristics of the filter sock used. Based on these metrics, analyses were conducted to determine the approximate level of trucking reductions that could be realized if chips created on site were used as a filter sock medium. These results suggest that the use of chips created during construction of well sites could significantly reduce truck traffic during development of unconventional resources.

Funding: Private (Myles Undergraduate Research Fund)

Program/mechanism supporting research/creative efforts: Faculty Adviser

Poster 64

Use of LiDAR imagery to constrain silicic lava emplacement processes

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Field (Broad Category): Geology/Geography (Sciences)

Student's Major: Geology

We are analyzing Light Detection And Range (LiDAR) data to understand the emplacement dynamics and styles of Obsidian Dome, a 600 year-old obsidian lava in eastern California. LiDAR data processed as three-dimensional topography maps allows us to construct two-dimensional topographic profiles in any orientation or length, with 1 m-scale accuracy. Silicic lavas are typically very rugged and difficult to traverse, so LiDAR maps provide a new and unique method to rapidly analyze a lava's topography. The topography of the lava is influenced by alternating ridges and depressions that are wrinkles of the upper surface. Like skin forming on top of gravy, the upper crust of the lava thickens and wrinkles as it cools and continues to flow. The sizes and shapes of those wrinkles, and, in particular their amplitude, can be related to the rheology of the flowing lava, and changes in the parameters should reflect changes in rheology and other flow conditions. We will present preliminary results from Obsidian Dome and adjacent lavas, and use these to constrain the lavas' rheologies in conjunction with published data and models.

Funding: Institutional/Federal (WVU and NSF)

Program/mechanism supporting research/creative efforts: Independent Study - 495 Level Course

Poster 65

Application of Thermal Processes to Improve Appalachian Hardwoods to Promote their Outdoor Applications

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Field (Broad Category): Natural Resources/Wood Science/Plant Science (Agriculture/Natural Resources)

Student's Major: Wood Science and Technology

Yellow-Poplar (*Liriodendron tulipifera*) is a common hardwood species of the Appalachian Forest. It is relatively fast growing, generally produces straight and tall logs, and is easily identified by its "tulip" shaped leaves. However, until this point its wood has been underutilized mainly because of its inferior physical and mechanical properties compared to other hardwoods. Therefore, this work aims to add commercial value to Yellow-Poplar hardwood for outdoor applications through controlled thermal treatment. Using a simple experimental design, several samples of Yellow-Poplar are exposed to heat in the temperatures ranging from 100-200°C in nitrogen atmosphere for two selected durations (2 and 4h). Control samples and heat-treated samples are being evaluated to compare their density, water absorption, swelling and compression strength according to standard ASTM 1037. In addition, the evaluation of porosity and resistance to fungi are also planned. Keywords- Appalachian Hardwood, Heat Treatment, Mechanical Properties.

Funding: Institutional (WVU)

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 66

Ecological and Urban Factors Impacting Wood Duck Nest Success

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Field (Broad Category): Wildlife Resources Management (Agriculture/Natural Resources)

Student's Major: Wildlife and Fishery Resources

Wood Duck (*Aix sponsa*) populations in the 1900's experienced dramatic population declines due to overhunting and habitat loss. Development of wood duck nest-boxes in conjunction with other management strategies, resulted in an increase in population size. However, habitat loss is still an issue for these cavity nesting birds, thus nest boxes continue to be a tool used by managers. Our goal was to use field-collected data to determine how nest box placement affects wood duck nest box use and success. We hypothesized that nest box use and success would be lower in boxes that are closer to urban cover and in shallow water. From March - July, 2017, we checked 57 nest boxes located in Pennsylvania and West Virginia, every two weeks with a GoPro Hero 3. We used logistic regression in RStudio to estimate the probability of use and success as it relates to our independent variables of interest. Probability of nest box use was positively related to distance to trees and water depth and negatively related to number of housing units in the area. Nest box use increased by ~ 200% if it was beyond 25 meters from a tree. Probability of nest success was positively related to water depth and distance to trees. Nests were most successful when they were at least twenty meters away from a tree. These results can be used as guidance for future nest box placement. Managers should avoid areas with housing units, areas near trees and target water deeper than 0.4 meters.

Funding: Institutional (WVU Davis College Undergraduate Research Program)

Program/mechanism supporting research/creative efforts: McNair Scholars Program and capstone course within my department

Poster 67

Passive Wetland Treatment of Acid Mine Drainage

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Field (Broad Category): Environmental Studies (Agriculture/Natural Resources)

Student's Major: Wildlife and Fisheries Management

Abstract Passive Wetland Treatment of Acid Mine Drainage Acid mine drainage is a common environmental problem that effects water ways throughout Appalachia. The acid is mainly formed when pyrite minerals that have been exposed to the surface from mining operations oxidize in water. The acidic waters are detrimental to the aquatic life that live in the system. Most life will die off from the impacted systems. This experiment tests how effective passive wetlands are at removing heavy metals from Lambert Run, which has been impacted by acid mine drainage. The removal efficiency will be tested by measuring the heavy metal content in the water before and after a series of five wetlands. Over an eight-month period samples will be taken from each site and tested. Since iron is one of the most prevalent metals in an acid mine drainage system, iron will be the targeted metal for removal. Passive wetlands can be an effective way to improve waters impacted by acid mine drainage and this study will give insight to the public on how effective they can be.

Funding: State (West Virginia Water Research Institute)

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 68

Mapping the Ancestral Fraser River Drainage Using Google Earth

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Field (Broad Category): Geology/Geography (Sciences)

Student's Major: Geology

We are attempting to map the course and elevation of the Ancestral Fraser River in central British Columbia, Canada, using Google Earth Pro. Based on previous work, we infer that the Fraser River switched direction to its present southward discharge into the Pacific Ocean within the last 1.2 million years, and probably after 0.75 million years. If this indeed the case, then evidence of the ancestral north-flowing river should be preserved in particular wide, flat terraces that were once the river valley floor. We have identified many terraces currently perched 10s to 100s of meters above the modern river. We are using Google Earth Pro to map these terraces and to establish the base level of the ancestral Fraser River before it reversed course and incised downwards through its old base. Furthermore, by establishing the slope of the ancient terraces, we can confirm the northward flow of the river in the past, and perhaps constrain where it exited into either the Pacific Ocean via the Columbia River or into the Arctic Ocean via the Mackenzie River. Finally, this study has economic and resource implications as the ancestral drainage basin is known to be a host to placer gold deposits in several ancient tributaries; better mapping the entire ancestral drainage system will help identify unknown placer deposits.

Funding: Institutional (WVU)

Program/mechanism supporting research/creative efforts: Voluntary efforts

Poster 69

Mapping and Morphometrics of Ancient Glacial Landforms in Central Namibia

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Field (Broad Category): Geology/Geography (Sciences)

Student's Major: Geology

Continental-scale glaciations, such as the glacier that covered much of the super-continent Gondwana, some 300 million years ago, leave behind a record of characteristic deposits and erosional landforms. Through geological time ancient glacial deposits are often transformed or removed, and are difficult to identify without detailed, up-close examination. Erosional landforms like drumlins (hills carved into bedrock by moving ice) and megagrooves (channels eroded into bedrock by ice), on the other hand, can be distinguished from a distance based on their size compared to neighboring bedrock and their elongated shape, making them ideal records of ancient glaciations on Mars and many remote parts of Earth. By studying the sizes and shapes of a suite of glacial landforms from the Pleistocene epoch (most recent period of glaciation) in parts of northern Canada and northern Scotland, we can classify and interpret the origins of ancient drumlin-like and megagroove-like landforms in Namibia (southern Africa) and other remote parts of Earth, as well as Mars, respectively.

Funding: State (NASA WV Space Grant Consortium)

Program/mechanism supporting research/creative efforts: a WVU 497-level course

Poster 70

The Effect of Far-Red LED Lighting on Mineral Uptake in Basil

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Field (Broad Category): Natural Resources/Wood Science/Plant Science (Sciences)

Student's Major: Biochemistry

A light-emitting diode (LED) is an energy efficient light source for plant production in controlled environments. Spectral quality of light can be manipulated to maximize growth in a crop specific manner. The effects of red and blue wavelengths on plant physiology have been well described. However, there is less knowledge on the effects of far-red light. Basil (*Ocimum basilicum* 'Italian Large Leaf') was grown under two different lighting treatments. Basil is an excellent model for this study because it is a valuable source of minerals. The first treatment consisted of red and blue LED lighting. The second treatment consisted of red, blue, and far-red LED lighting. The basil was harvested after growing for two weeks under the various lighting treatments. The concentrations of the following minerals in each treatment were determined by inductively coupled plasma spectroscopy: iron (Fe), manganese (Mn), magnesium (Mg), calcium (Ca), potassium (K), sodium (Na), phosphorous (P), copper (Cu), and zinc (Zn). The interaction between LED treatment and mineral uptake was statistically significant. Specifically, the treatment including far-red lighting resulted in 12.8 mg/L greater K concentration than the treatment lacking far-red. Far-red lighting seemed to impact potassium uptake in basil.

Funding: Not Funded

Program/mechanism supporting research/creative efforts: McNair Scholars Program

Poster 71

Petrography and Geochemistry of Megacrystic K-Feldspars from A Granitoid Intrusion, Northwestern Nevada

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Field (Broad Category): Geology/Geography (Sciences)

Student's Major: Geology

Potassium feldspar (K-feldspar) is a common rock-forming mineral found in igneous intrusions world-wide. While most igneous intrusions contain K-feldspar (<1cm), relatively few intrusions have exceptionally large, euhedral crystals (>4cm). The processes responsible for the formation of these large crystals (megacrysts) have eluded geologists for nearly a century. This study examines the K-feldspar megacrysts from the Granite Peak stock (GPS) in northwestern Nevada in order to place constraints on the origin and processes responsible for megacryst formation. The GPS megacrysts are euhedral crystals with complex, oscillatory Ba zonation boundaries which suggests growth in a dynamic system. Petrographic observations indicate that GPS megacrysts are commonly sector zoned and contain abundant mineral inclusions (e.g., plagioclase, quartz, biotite, and accessory phases) that are preferentially oriented parallel to zonation boundaries. While petrographic observations are good indications of mode of formation, they can vary depending on the chemical composition and dissolved volatiles within a melt. Electron probe micro-analyses (EMPA) were conducted to complement petrographic observations and identify chemical changes within megacrysts and their inclusions. EMPA reveals that the host megacrysts are orthoclase (Or80 - Or90) and contain normally-zoned plagioclase inclusions (An30 -An50). The data also reveals that plagioclase inclusions formed before the plagioclase in the groundmass (An20-An30). These data suggest that K-feldspar crystallization initiated earlier than predicted by phase relationships. This could be attributed to high concentrations of Ba within the system. Investigating these data can help us better understand megacryst formation while providing insight into the processes that caused these crystals to grow so large.

Funding: State (NASA West Virginia Space Grant Consortium)

Program/mechanism supporting research/creative efforts: a WVU 497-level course

Poster 72

Petrographic and Geochemical Investigations of the McCartney Mtn. pluton. Southwestern Montana

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Field (Broad Category): Geology/Geography (Sciences)

Student's Major: Geology

Southwestern Montana contains an extensive record of Late Cretaceous to Eocene-aged magmatism that is well-preserved within a suite of granitoid batholiths, namely the Boulder, Pioneer, Mount Powell, Philipsburg, and Tobacco Root batholiths. Located approximately 15 miles north of Dillion, MT, is the McCartney Mtn. pluton. This granitoid intrusion, along with a series of smaller unnamed intrusions, were emplaced between the Pioneer and Boulder batholiths ~75 million years ago. Although it has been hypothesized that the pluton is related to the Pioneer batholith, this correlation is not well-established. To address this issue, this study focuses on characterizing the petrography and geochemistry of the McCartney Mtn. pluton in order to evaluate this hypothesis. Preliminary field observations indicate that the pluton is predominantly composed of hornblende-biotite granodiorite with minor quartz diorite. Petrographic observations indicate that quartz, plagioclase, alkali feldspar, hornblende, and biotite are dominant mineral phases. Future geochemical analyses will be collected on 5 samples: one sample from a small intrusion 1km west of the McCartney Mtn. pluton, and 4 samples from the SW margin of the pluton. These new analyses will be compared to existing geochemical data for the Pioneer batholith. Combined with petrographic observations, these comparisons will allow us to determine if the magmatic systems are connected or if the McCartney Mtn. pluton is an independent system from the Pioneer batholith.

Funding: Institutional (WVU)

Program/mechanism supporting research/creative efforts: a WVU 497-level course

Poster 73

Generation and Analysis of Inertial Cavitation

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Field (Broad Category): Biomedical Engineering (Health Sciences)

Student's Major: Biomedical Engineering

Last summer, I had the opportunity to study the concept of cavitation, which is generally a destructive phenomenon that occurs under significant pressure changes. This idea involves the collapsing of a microbubble which produces a shockwave, usually resulting in damage at the micro level on nearby surfaces. Cavitation is a very uncontrolled and violent occurrence, affecting most commonly, turbines and propellers. This motivates the desire to study and understand the exact mechanism to find ways to modify surfaces to prevent as much damage from occurring. So far, we have successfully found two cost-effective methods of analyzing and imaging cavitation, with the use of ultrasonic transducers to induce cavitation of water vapor microbubbles and collapse air microbubbles. The next steps would be to utilize the collapsing mechanism of microbubbles to be advantageous in targeted cell activities, like drug delivery and gene therapy. With this opportunity, I got to experience research within my field of study. The best part of the experience was the end, when we obtained actual results and were able to progress the study. I learned that research is a long and hard path but a worthwhile process that requires patience, and yields rewarding results in due time. This experience has helped me develop as a person as well as an engineer.

Funding: Department of Energy Office of Science under the Science Undergraduate Laboratory Internship (SULI) Program at Ames Laboratory

Program/mechanism supporting research/creative efforts: SULI

Poster 74

Salamander Preference for Cover Object Size

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Field (Broad Category): Natural Resources/Wood Science/Plant Science (Agriculture/Natural Resources)

Student's Major: Biochemistry

Terrestrial salamanders spend the majority of their life underground, but periodically come to the surface from spring-fall to forage, breed, and move. The majority of surface activity occurs at night, particularly when humidity is high. During the day, individuals often take refuge under objects on the forest floor, such as rocks and downed woody debris. Selection of refuge objects is of interest to biologists to better understand the habitat needs of salamanders, and to assist with sampling their populations. This study will investigate salamander selection of cover objects based on their size and type (wood/rock). Terrestrial salamanders were sampled in 18-20m x 20m plots from spring-fall of 2017 at New River Gorge National River. Salamanders found were identified, measured, and tail-clipped to collect genetic samples and delineate new captures from recaptures. The type and size of cover objects surveyed was also recorded, whether or not a salamander was detected. Using these data, I will seek to determine if salamanders showed a preference for rocks or woody debris, and the relationship between cover object size and salamander use. An ethical consideration is that we are disturbing and collecting tissue from individual salamanders. However, salamanders were released alive at their capture locations, and can regenerate lost portions of their tails.

Funding: Federal

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Behavioral Sciences Category

Poster 75

Experimentally Constructing Cooperation

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Field (Broad Category): Psychology (Social Sciences)

Student's Major: Psychology

Assistance and coordination in animals have been previously studied. Pairs of rats coordinated their behavior and assisted one another in order to obtain food and avoid electric shock. Results indicated that the rats not only assisted one another, but that they also took turns (Daniel, 1942). The current experiment is a systematic replication of Daniel (1942) in which two pigeons are required to coordinate their responses to obtain food. The experimental apparatus consists of a food hopper wired to an elevated platform. When the platform is depressed, the hopper is raised to provide access to food. As the platform is located at a distance from the hopper, a pigeon cannot depress the platform and eat from the hopper simultaneously. Instead, the only way to obtain food is for one pigeon to depress the platform while the other accesses the raised hopper. In the current experiment, pigeons were trained to shape this coordinated behavior. This was accomplished via the use of two colored lights (red and white), which each signaled a different response for each pigeon. For one pigeon, a white light signaled depressing the platform and a red light signaled food availability at the hopper. For the other pigeon, the responses signaled by the lights were reversed. Currently, the illuminated light switches on each trial so that both pigeons earn an equal number of reinforcers. Over the course of future trials, the lights will be gradually faded so that each pigeon's behavior comes under the control of the current response.

Funding: Not Funded

Program/mechanism supporting research/creative efforts: Voluntary efforts

Poster 76

Reducing Prejudice Against Sexual Minorities: Investigating Social Dominance Orientation

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Field (Broad Category): Psychology (Social Sciences)

Student's Major: Psychology

Intergroup contact, defined as the interaction between members of different groups, can have an impact on how people view other unrelated social groups and can reduce prejudice; this is known as secondary transfer effect. Previous research has shown that contact with one racial minority group (e.g., gay men) can lead to reductions in prejudice toward other minority groups (e.g., bisexual women). This effect is due to a change in social dominance orientation (SDO), or the extent to which an individual endorses group hierarchy and inequality among groups. In the current study, we tested whether social dominance orientation mediated the association between intergroup contact and prejudice attitudes toward sexual minority groups. Participants were a SONA student sample and a community sample recruited using Amazon's Mechanical Turk. Next, we will conduct a mediation analysis among these variables. We expect our results to confirm that social dominance orientation will mediate the association between participant-reported intergroup contact and prejudice attitudes toward sexual minority groups.

Funding: Not Funded

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 77

The relationship between accuracy of peer feedback and writing quality among students

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Field (Broad Category): Educational Psychology (Education)

Student's Major: Psychology

There is little research on how the use of formative assessment in classrooms can improve the quality of writing and learning, particularly in middle school students. This project seeks to fill this gap by examining middle school students' quality of writing in a problem-posing activity and compare it to the accuracy of the peer feedback received. We hypothesized that students would be more likely to ignore feedback they received if it was incorrect, and that students will have a lower quality second draft of their assignment if they implement the incorrect feedback. To address this hypothesis, the study implements a pretest/posttest experimental design in a sixth-grade math class, in which each student gave feedback on other students' assignments and received feedback from their teacher and four assigned peers. Quality of writing will be measured by the correct implementation of revisions suggested by the peer reviewer, and accuracy of feedback will be measured as whether or not the feedback given is a change that must be made to meet the requirements of the assigned rubric. Analyses will include paired samples t-tests. The findings will help illustrate how an understanding of formative assessment can improve quality of writing in classrooms.

Funding: Not Funded

Program/mechanism supporting research/creative efforts: Voluntary efforts

Poster 78

Personality Predicting the Initiation of Alcohol Use during the Transition to College

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Field (Broad Category): Psychology (Social Sciences)

Student's Major: Psychology

The transition to college for a high school student is a critical developmental period that can lead to the use and abuse of alcohol. Problematic alcohol use can influence social relationships, academic performance, and health over time. Thus, the current study will examine how personality traits predict the initiation of alcohol use within the first 30 days of attendance to college, as well as the quantity of alcohol use. Data comes from the College Student Transition (CST) Study that includes data from 580 participants. Participants completed an online survey in July/August before their freshman year started, and another online assessment 30 days after the freshman year started. The survey included questions about demographic factors, substance use, and personality factors. This study can provide key data to understand how personality traits may predict alcohol use behaviors early in college. Such information is necessary to develop and implement prevention programs aimed at improving the college experience at all college campuses across the nation.

Funding: McNair Scholars Program

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 79

Emotiv EPOC Research

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Field (Broad Category): Neuroscience (Technology)

Student's Major: Computer Engineering

Electroencephalography (EEG) headsets, being highly portable, present a convenient and noninvasive method of recording electrical activity in the brain. In our study, we seek to develop a method for the classification of thoughts, memories, and stimuli from EEG headset data, to be implemented in future technologies requiring brain-computer interface. Using Emotiv EPOC EEG portable headsets we test subjects with various stimuli in order to obtain the most truthful results. Examples of the stimuli used varies from pictures, to food, to sounds; each stimulating the senses differently. For analysis of multidimensional EEG data, we adopt the use of support vector machine (SVM) learning algorithms, to be trained in the classification of event-related potentials corresponding to identifiable thoughts or stimuli in EEG data sets. To optimally analyze and classify brain activity, we aim to reduce noise while preserving electrical behavior by applying analysis to interval centroids of the time series data. T-distributed stochastic neighbor embedding algorithms allow the visualization of the 14-dimensional data in 2-D space.

Funding: Not Funded

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 80

Cognitive Dissonance and Learning in Skill Based and Experiential Education

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Field (Broad Category): Agriculture (Education)

Student's Major: Horticulture

Cognitive dissonance is defined by Merriam Webster as "Psychological conflict resulting from incongruous beliefs and attitudes held simultaneously." Examples of this would be someone who cares about the planet driving a car that is not fuel efficient, or a student learning that something they believed was done a certain way is not. Previous research led us to say that this phenomenon is an important tool for both educators and students (Dewey, 1919, 1938). This study examines students' levels of frustration in regards to skills based, experiential education. Every day in a college level welding and metal fabrication class, students were asked to rate their confidence in the welding activity practiced that day before and after class, as well as their frustration levels while performing the task using a Likert type scale. These data were examined by calculating a simple linear regression. From that regression, predictions about skill attainment were made based on levels of initial frustration. Using these results, we are able to examine the link between frustration while learning and how well a student has received information. Finding how cognitive dissonance and education relate could help design a new and better way to learn and receive hands on skill and information.

Funding: Not Funded

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 81

Relationships between Anxiety, Political Ideology, and Sexism Moderated by Gender.

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Field (Broad Category): Psychology (Social Sciences)

Student's Major: Psychology & Biology

Objective: Sexism includes two components: hostile sexism (related to negative stereotypes about women), and benevolent sexism (related to positive stereotypes about women). In the current study, we test whether political ideology, anxiety, and gender differentially predict hostile and benevolent sexism. We hypothesized that there would be a relationship between benevolent sexism and anxiety, moderated by gender, and a relationship between political ideology and hostile sexism, not moderated by gender. **Method:** Undergraduate psychology students ($N = 229$) completed a series of questionnaires, including measures of anxiety, neuroticism (a personality trait related to anxiety), intolerance of uncertainty (a risk factor for anxiety disorders), political ideology, and ambivalent sexism (a measure of both hostile and benevolent sexism). **Results:** Results suggest that in general, participants reported more benevolent (vs. hostile) sexism. Additionally, more conservative political ideology was associated with more sexism, although this relationship was stronger for hostile sexism compared to benevolent sexism. Finally, higher levels of intolerance of uncertainty was associated with more sexism for men, but not for women. Surprisingly, when anxiety or neuroticism were included in the analysis instead of intolerance of uncertainty, only political ideology predicted sexism. **Conclusions:** Findings are in line with previous research suggesting both conservative ideology and intolerance of uncertainty are associated with a desire to maintain the status quo (e.g., maintain male dominance in society). Limitations of the study include inability to determine causality, and a small number of men in the study sample.

Funding: Not Funded

Program/mechanism supporting research/creative efforts: capstone course within my department

Poster 82

The Feasibility of SCAN!

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Field (Broad Category): Pharmaceutical Sciences (Health Sciences)

Student's Major: Nursing

Background: Skin cancer is the most common cancer in the United States. Skin cancer can be prevented by decreasing exposure to harmful UV radiation (i.e., SPF 30 sunscreen, sun-protective clothing, sunglasses, shade) and can be detected early through routine cancer screening. However, some have less access to skin cancer prevention and early detection, such as those in the medically-underserved Appalachian region. Community pharmacies are available throughout Appalachia but are under-used for health promotion. **Purpose:** This study explores the feasibility of a pharmacy intervention to encourage sun safety: SCAN! (Skin Cancer Awareness Now) in community pharmacy. **Methods:** Men and women ($n=90$) at community pharmacies ($n=3$) participated in a pre- post-intervention study to understand the impact of SCAN! **Results:** Our findings indicated that most liked the SCAN! ($M=6.1$ on a 1-7 scale) and understood the content of the intervention ($M=6.7$ on a 1-7 scale). Further, nearly all were able to quickly summarize the content of the SCAN! Intervention. Similarly, most intended to engage in sun safety behaviors ($M=6.0$ on a 1-7 scale). Participants liked the educational information, the one-on-one interaction with the student pharmacist, and the informational materials provided. **Conclusion:** Our study indicates that a community pharmacy intervention was well-liked by participants and may be useful for a larger study to understand the impact of SCAN! on behavior.

Funding: State (WV Community Engagement)

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 83

The Impact of Social Media's Healthy Lifestyles and Fit Bodies on Teenage Girls

Emily Clegg*, **Miriam P. Leary**, **Madison Santella**, **Federica Barazzetta**, **Pamela J. Murray**, **Julie Downs** and **Melissa D. Olfert**

Human Nutrition and Foods, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Human Nutrition and Foods (Agriculture/Natural Resources)

Student's Major: Human Nutrition and Foods

Objective: To qualitatively assess the impact of the healthy lifestyles and fit bodies seen on social media on teen girls. **Methods:** Using mixed methodology (quantitative and qualitative), teen girls in Middle School (MS) and High School (HS) completed a 17-item survey and participated in focus group discussions moderated by trained researchers. Thematic analysis of the data was conducted by independent reviewers looking for saturation of repetitive concepts. **Results:** Participants included eight MS (age: 12.4 ± 0.7 years; BMI: 25.2 ± 8.9 kg/m²) and 19 HS (age: 16.1 ± 1.3 years; BMI: 23.3 ± 3.6 kg/m²) girls. MS girls are motivated by SM pages; people that emphasize healthy lifestyles; and fit bodies. They recognize that some content is unrealistic, but become more motivated when they see other motivated individuals. Some MS girls reported feeling discouraged and envious, particularly when viewing posts of very fit people or celebrities. HS teens tend to report feeling discouraged and envious, but acknowledge that this content can also be motivating. HS girls seemed more aware that many ads and posts are photo-enhanced or manipulated and that attaining the same physique is often unrealistic. **Conclusions:** While both MS and HS groups reported feeling discouraged and envious, MS girls reported more motivation from this SM content while HS girls appeared more aware that these images were manipulated.

Funding: Institutional (WVU Hatch WV00641; Collaboration with Carnegie Mellon University)

Program/mechanism supporting research/creative efforts: a WVU 497-level course

Poster 84

Guardianship in the Modern Age of Cell Phone Technology

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Field (Broad Category): Sociology (Social Sciences)

Student's Major: Political Science & Sociology

With the growth of technology and social media, many people would rather record a crime, fight, victim, etc., and post the video on social media, rather than stepping up and intervening in the situation. This is mainly due to the bystander effect, which is when people will tend to follow the crowd and not help a victim in a situation. They feel that if nobody else is helping, why should they. In addition to not intervening, bystanders have become more and more likely to record an incident on their cell phone and post it to social media, as previously stated. There was a countless number of cases researched and analyzed, and there was a variety in the types of cases. There are many cases that display poor examples of bystander intervention, and in turn are detrimental to the victim. With that being said, there are also several cases of good bystander intervention, where the victim was helped by a bystander's video. In conclusion, technology and social media has changed the way society acts as bystanders.

Funding: Not Funded

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 85

Imitation in Pigeons

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Field (Broad Category): Psychology (Social Sciences)

Student's Major: Criminology & Psychology

An experimentally used pigeon 2748 was placed in a holding cage. Once in the cage 2748 would exhibit an escape behavior. The holding cage is commonly used in the lab and had no prior learning of the escape behavior. The pigeon doesn't receive a food reinforcer upon escaping. The reinforcer in the experiment is the opportunity to escape. After conducting baselines on 2748, we received an average escape time. Next, we placed a mirror in front of 2748's holding cage, on average 2748 significantly escaped faster. This ruled out the possibility of social facilitation. We then conducted a baseline on the naïve pigeon. The pigeon did not exhibit the escape behavior. We placed two naïve pigeons across from each other. We are looking to see if the one pigeon will imitate the other's behavior and escape. As expected this did not occur since the pigeon has not previously escaped. Once all baselines are conducted we will place the naïve pigeon across from 2748. We expect 2748 will continue to escape in the presence of the naïve pigeon. After repeated exposure, the naïve pigeon will imitate 2748 and escape, in the presence of the 2748 and on his own.

Funding: Not Funded

Program/mechanism supporting research/creative efforts: capstone course within my department, PSYC 495A

Poster 86

Impact of physical activity on psychosocial outcomes in Cardiac Rehabilitation

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Field (Broad Category): Medical Sciences (Health Sciences)

Student's Major: Biochemistry

Cardiac rehabilitation (CR) forms a structured outpatient program for secondary prevention of Cardio Vascular Disease and is an essential component of care for all cardiac patients. It promotes a healthy active lifestyle with improvement in cardiac function, increased exercise tolerance and decreased cardiovascular symptoms. Cardiac Rehabilitation is known to improve outcomes in patients with Coronary Heart Disease (CHD). Outcome improvement includes mortality benefit along with significant improvement in psychosocial risk factors in these patients. The study involved retrospective analysis of patients who underwent cardiac rehabilitation at Heart and Vascular Institute, West Virginia University. A total of 156 patients were included. Demographic and clinical variables were assessed including age, gender, race, smoking, HTN, HLD, DM, CVA, CHF, PHTN and Ischemic heart disease. Our studies showed a significant improvement in psychosocial outcomes including QOL (21.71 ± 0.71 to 23.53 ± 0.66 , $p=0.0003$, $n=156$), PHQ-9 (5.56 ± 0.84 to 4.11 ± 0.75 , $p=0.01$, $n=156$) and GAD scores (4.62 ± 0.8 to 3.41 ± 0.75 , $p=0.03$, $n=156$). The improvement in overall quality of life directly correlated with the duration of cardiac rehabilitation and occurred irrespective of any significant change in weight (BMI +5%).

Funding: Not Funded

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 87

Social Media Data Analytics for Curing Construction Labor Mental Healthiness

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Field (Broad Category): Civil/Environmental Engineering (Engineering)

Student's Major: Industrial Engineering

During the Fall 2017 and Spring 2018 semesters, I participated in the Research Apprenticeship Program at West Virginia University. During this time, I worked under my mentor, Dr. Liyaning Tang, who is a professor in the Department of Civil and Environmental Engineering at WVU. Our area of research was focused on four different clusters of the construction industry: workers, companies, unions, and the media. I analyzed the construction industry in both America and China by using social media data from Twitter and Weibo. The entire point of our research is to compare the differences and similarities between the two different types of ethnicities. Our research shows data from Workers, Companies, Unions, and the Media to be able to determine how the construction industry could be operating more efficiently. I was assigned to organize all of the data from both social media platforms and integrate them into charts and graphs in Microsoft Excel to help see the differences between the construction industries in these two countries. This has the ability to show an audience what needs to be improved upon within the industry, it prevents workers from having to take surveys in order to evaluate how they see their company's performance. For example, if workers are having negative tweets then companies will be able to identify those problems and help make their worker's experience better.

Funding: Not Funded

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 88

Forensic Footwear Examinations: Evaluating Factors that Influence Accuracy

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Field (Broad Category): Forensics (Sciences)

Student's Major: Forensic and Investigative Science

The forensic evaluation of footwear evidence involves the comparison of class and randomly acquired characteristics (RACs) between questioned (crime scene) and known (exemplar) impressions. The goal of this comparison is to produce a conclusion regarding possible source attribution, which is believed to be a function of a multitude of factors, including the examiner's background, the perceived rarity of the outsole pattern, the level of detail discernible in the crime scene impression, as well as the nature, type, number, and significance of the correspondences and dissimilarities that exist between the impressions being compared. Since the final conclusion is a type of subjective judgement, research is needed to better understand the complexity of the expert decision-making process. With this in mind, 63 footwear examiners were asked to evaluate 12 questioned/exemplar comparisons created using various substrates (ceramic tile, vinyl tile, paper) and media (dust, blood), resulting in impressions that varied in both quality and totality. The conclusions were then evaluated using the chi-square test of independence to determine the degree to which accuracy varied as a function of selected variables, including examiner qualifications (such as certification status and years of experience), feature recognition (class, subclass, and individualizing), and feature value (or degree of similarity).

Funding: Federal (National Institute of Justice, Office of Justice Program, U.S. Department of Justice)

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 89

Utilizing Peer Feedback and Writing in a Math Class

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WV 26506*

Field (Broad Category): Educational Psychology (Education)

Student's Major: Psychology

A problem in West Virginia is the below average math scores on standardized assessments. This study looks into incorporating writing in math classes through peer assessment as a solution. The focus is on the quantity and quality of peer feedback compared to teacher feedback. The quantity is measured by number of comments. The quality of the comment is measured by the type of issues, accuracy, and whether it states a problem or gives a solution. A pretest and posttest were given to students in a sixth-grade math class. Students both gave and received feedback from the teacher and four randomly assigned peers. It is predicted that the quantity of the teacher comments decreased as time increased and that the amount of high quality comments from students will be greater than the amount of high quality comments from teachers. Data showed teachers left fewer comments over time, while there is no significant difference between the quality of teacher feedback and peer feedback. These predictions illustrate why utilizing peer assessment in a class setting can be beneficial.

Funding: Not Funded

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 90

Teen Girls' Trust and Usage of Social Media Outlets Regarding Health Content

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Field (Broad Category): Human Nutrition and Foods (Agriculture/Natural Resources)

Student's Major: Human Nutrition and Foods

Objective: To determine teen girls' trust and usage of social media (SM) regarding nutrition and physical activity related information. **Methods:** Using mixed methodology (quantitative and qualitative), High School (HS) and Middle School (MS) teen girls participated in surveys and focus group discussions moderated by trained researchers. Data were content analyzed to identify common themes using independent data reviewers with a tie breaker when necessary. **Results:** Eight MS (age: 12.4 ± 0.7 years; BMI: 25.2 ± 8.9 kg/m²) girls and 19 HS (age: 16.1 ± 1.3 years; BMI: 23.3 ± 3.6 kg/m²) girls participated in online surveys and focus groups. All girls reported seeing health, nutrition, and fitness related content on SM, often in paid advertisements. While most teen girls do not follow health related SM accounts, those that do see mainly healthy recipes or fitness related content. Both MS and HS girls report sport specific and celebrity posting to be common. Both groups seemed to be able to recognize falsified claims and reported distrusting paid/sponsored and contradicting information. Teen girls tended to trust posts from people they knew personally, or if they had seen it posted repeatedly. Teens report not following reliable news sources, but recommend researching, asking others, or fact checking to validate untrusted information seen on SM. **Conclusions:** Teen girls see fitness and other health related content on SM and recognize the potential to encounter false information. Though verifying dubious information was recommended, teen girls rely on less stringent methods for trusting health related information on SM.

Funding: Institutional (WVU Hatch WV00641; Collaboration with Carnegie Mellon University)

Program/mechanism supporting research/creative efforts: a WVU 497-level course

Poster 91

Automatic Assessment of Gait Pattern Symmetry with Wearable Sensors

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Field (Broad Category): Biomedical Engineering (Health Sciences)

Student's Major: Exercise Physiology

The wearable sensors offer multiple opportunities to track human performance in activities of daily living and in rehabilitation. What we would like to do with the wearable sensors is to measure how symmetrical people are and to calculate phase asymmetries that may represent current or potential injury. The premise is that symmetry, in motor tasks, is indicative of musculoskeletal health and the balanced and coordinated neural commands. In our study we will use accelerometers, ground reaction sensors built into a split-belt treadmill, and wireless electromyography (EMG) sensors. Our target time for each session is about ten to fifteen minutes. Subjects will be asked to walk on the split-belt treadmill in asymmetric and symmetric tasks at different speeds. We will use VO₂max measurement to track the metabolic requirements of each of these tasks. Our prediction is that the symmetrical gait will be associated with the lowest energy requirements compared to the requirements in asymmetrical gait. I have helped in designing the study and have been preparing to collect the preliminary data.

Funding: Federal

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 92

Forensic Footwear Analysis: Are Wear Features on Outsoles Randomly Distributed?

Megan Lawther,* Nicole Richetelli and Jacqueline A. Speir

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Field (Broad Category): Forensics (Sciences)

Student's Major: Forensic and Investigative Science

A shoe which experiences regular use, comes into contact with various surfaces, and as a result, the accumulation of wear features tends to occur. The term for these features is randomly acquired characteristics (RACs), and the correspondence between RACs on crime scene (questioned) and known (exemplar) impressions forms the basis of forensic footwear comparisons. Until recently, these features were presumed to be randomly distributed; in fact, the moniker of "random" has even become part of the features' label (i.e., "randomly acquired characteristics"). However, the statistical analysis of 13,500 RACs distributed over 380 shoes suggests that this assumption may not be true, and that additional research is needed (Damary et al. 2018). In response to this, a complementary analysis has been undertaken to determine the degree to which RACs conform to the assumptions of complete spatial randomness (CSR), as assessed using a database of more than 72,300 RACs distributed over 1,300 shoes. Preliminary Bartlett test results suggest that the variance in RAC counts may deviate from complete spatial randomness. However, additional study is needed to modify the conclusions as a function of outsole contact area, which may introduce over- or under-dispersion in the counts.

Funding: Federal (National Institute of Justice, Office of Justice Program, U.S. Department of Justice)

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 93

Effects of post-stroke infections on ischemic stroke outcomes at J.W. Ruby Memorial Hospital

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Field (Broad Category): Immunology (Health Sciences)

Student's Major: Immunology and Medical Microbiology

Stroke is a major cause of chronic disability and the fifth leading cause of death in the United States. Per capita, the number of strokes in West Virginia, is one of the highest in the nation. One of most common yet poorly understood complications in stroke patients is post-stroke infection and immunosuppression. The goal of this study was to determine how post-stroke infection affects hospital length of stay and stroke outcome, and we hypothesized that these outcomes would be worse in stroke patients with infection (cases) compared to stroke patients without infection (controls). We conducted a retrospective chart review of patients with an ischemic stroke diagnosis who were admitted to J.W. Ruby Memorial Hospital from 2012-2015. Patients were selected using the medical record billing codes ICD9:43.01, ICD9:434.11, and ICD10:I63, and variables associated with demographics, stroke severity, and immune function were recorded. A preliminary analysis of the patient population (n=99) revealed a statistically significant difference between stroke cases and controls for: age ($p < 0.01$), hospital length of stay ($p < 0.0007$), and the National Institutes of Health Stroke Scale (NIHSS) discharge score ($p < 0.031$). These results suggest that post-stroke acquired infections are more common in older patients and may be associated with worse stroke outcomes.

Funding: Other

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 94

Social Support and its Effect on Relational Outcomes in On-again/Off-again Relationships

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Field (Broad Category): Communication Studies (Social Sciences)

Student's Major: Communication Studies

The purpose of this study was to investigate how social support affects relational outcomes within the context of on-again/off-again relationships. In this study, we identified three relational outcomes (i.e., relationship satisfaction, commitment and trust) and identified five social support behaviors (i.e., emotional support, esteem support, network support, informational support and tangible support). Participants were 147 undergraduate students enrolled in communication studies courses at a large Mid-Atlantic university. Participants were required to currently be in or have previously been in an on-again/off-again relationship. The Relationship Assessment Scale, Investment Model, and the Dyadic Trust Scale were used to measure relational outcomes and The Measure of Social Support was used to measure the five socially supportive behaviors. The results reflect that esteem support was the most given form of social support. The results supported the hypothesis, which stated that relationship satisfaction, commitment, and trust would be related to participants' provision of social support. Replication of this study solely in the context of committed relationships, by comparison with this study, could reduce limitations of this study in the future. In order to do so, researchers could observe the contrasting effects of received social support from a partner in an on-again/off-again relationship, as opposed to only given effects.

Funding: Private (McConnell Chair Ambassadors Program)

Program/mechanism supporting research/creative efforts: McConnell Chair Ambassadors Program

Poster 95

Individuals' Conflict-Handling Styles in Relation to Perceived Friendship Qualities

Addison N. Oliver,* Charles L. Webster,* Stephanie M. Buggs* and Scott A. Myers
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Field (Broad Category): Communication Studies (Social Sciences)

Student's Major: Communication Studies

The purpose of this study was to examine how perceived qualities of friendship differ based on an individual's conflict-handling style. For this study, individuals were able to define a "close friend" relationship as they deemed appropriate. Individuals who participated in the study completed a survey comprised of two measurements. Participants' perceived valued friendship qualities were measured using the Friendship Quality Scale (FQUA), and their conflict-handling style used within that close friendship was measure using the Rahim Organizational Conflict Inventory-II. Participants were 155 undergraduate students from a large Mid-Atlantic university enrolled in a variety of communication studies courses. The results indicated full support for the first hypothesis stating that the most positive correlation for the closeness friendship quality would be with the collaborating conflict-handling style, but yielded no support for the second hypothesis which stated the acceptance friendship quality would have the strongest positive correlation with the accommodating conflict-handling style. Future research should consider examining positive and negative qualities of friendship together.

Funding: Private (McConnell Chair Ambassadors Program)

Program/mechanism supporting research/creative efforts: McConnell Chair Ambassadors Program

Poster 96

An Examination of Best Practices of Public Space Design in Pediatric Healthcare Environments

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Field (Broad Category): Architecture/Design

Student's Major: Multidisciplinary Studies

This systematic literature review examines the effect of positive distractions on hospital occupants in pediatric healthcare facilities. "Positive distractions" are built environmental features that are utilized to reduce stress by diverting attention, and have become important tools in designing healthcare environments (Ulrich, 1991). In this review, twenty-four studies were collected for analysis from architectural and medicine databases. Findings highlighted the importance of incorporating positive design elements, such as interactive play devices, multi-sensory installations, and replications of the natural environment (Adams, 2010). The analysis conducted suggests that incorporating positive distractions enhances occupant psychological experience and health outcomes: (1) emotional well-being, (2) perceived quality of care, (3) anxiety and stress levels, and (4) overall restlessness in patient's composure. Furthermore, six case studies were found, which were representative of innovative healthcare gardens. Results advise that future studies assess relationships between positive distractions and clinical public green spaces. The correlations observed in this review expands knowledge in current design issues in environmental psychology, and its results contribute to healthcare architectural practices.

Funding: Private (US Play Coalition)

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 97

Feasibility of Participants' Health Indicators of Individuals with Disabilities Using No-cost Social Media

Tessa Shaffer,* Ashley Tyler, Carson Purcell and Jason Bishop

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Field (Broad Category): Exercise Science/Physiology (Health Sciences)

Student's Major: History

The health effects that stem from young adults and teenagers living with ASD or chronic mobility impairments transitioning into adult life is a priority of rehabilitation research. Because of their impairment, these individuals are often more sedentary and have increased but avoidable secondary health conditions. The priority is to raise the quality of life by enhancing the health and function of this sector of the population. The health effects of this life transition for those living in rural areas is unexplored. Existing health promotion plans normally target more densely populated areas. Our research project is a feasibility study that is searching for the answer to the causes of this sedentary lifestyle and analyze the quality of life of those transitioning individuals, specifically from high school, with disabilities in rural areas. Because many people with disabilities use technology and social media to communicate with the world, an online health indicator survey on social media platform, Facebook, is our attempt to overcome the problem of acquiring participants that have ASD or chronic mobility disabilities. Ultimately, we hope to gauge these individuals with disabilities' quality of life and have our results used to form health promotional programs for this sector of the population and increase their health and function.

Funding: Federal (WVU IRB)

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 98

The Effects of Dopaminergic Therapy on Risk-Based Decision-Making following Frontal TBI in Rats

Trinity K. Shaver,* Caitlyn E. Cabral,* Binxing I. Zhu,* Robelle B. Dalida,* Anastasios D. Lake,* Cory

Whirtley, Christopher O'Hearn and Cole Vonder Haar

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Field (Broad Category): Psychology/Neuroscience (Sciences)

Student's Major: Psychology

Traumatic brain injuries (TBI) can cause severe and long-term deficits. With no pharmacological treatments available and increased cognitive impairments experienced by TBI patients in mind, it is important to observe the effects that TBI has on processes such as decision-making and learning. Forty-eight rats were behaviorally assessed on the rodent gambling task (RGT) after one-half of rats were given a bilateral, frontal controlled cortical impact injury. Rats chose among low-risk options, with a high probability of receiving a small reward, and risky options, with a large reward, but low-probability. One-half of rats were administered methylphenidate through Jell-O tablets prior to behavioral assessment to assess dopaminergic effects on task performance. Following ten weeks of behavioral assessment, rats were transcardially perfused. Rats who underwent injury displayed impairments in risk-decision making, with a significant decrease in choice of the most optimal option. Rats who were administered methylphenidate displayed a significant decrease in choice of the most optimal option, but not a significant difference in impulsivity. These data suggest that methylphenidate may not be an effective therapeutic to treat impulsivity and risk-based decision-making behavior in TBI patients. Further investigation into lower-dose methylphenidate may be warranted.

Funding: Institutional (WVU)

Program/mechanism supporting research/creative efforts: an external internship or other type of program

Poster 99

Correlations between Maternal Depression, Breast Feeding Self-efficacy, and Maternal Literacy Practices

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Field (Broad Category): Child Development

Student's Major: Speech and Language Pathology

Maternal depression is related to poor developmental outcomes for children. The focus of this study was to examine the effects of maternal depression on child literacy and breastfeeding outcomes (e.g., breastfeeding self-efficacy). The study will examine the possible correlations between depression, mothers' engagement in literacy practices, and their confidence regarding breastfeeding. It is important to examine the outcomes related to maternal depression because as it can affect a child mentally, physically, and emotionally throughout their lives. In this study, participants were recruited from different counties across West Virginia. Each participant was interviewed about her living situation, relationships, mental health, and the development of her child during and after pregnancy. Three interviews involving questions about pregnancy status, relationships, and living situations were given between their first trimester through their third trimester. After pregnancy, interviews about child development, breastfeeding self-efficacy, and maternal depression, and mothers' engagement in literacy practices were given to each participant from their child's birth through 3 years of age. The results will be analyzed by conducting maternal literacy practices, and breast feeding.

Funding: Institutional (West Virginia Department of Health and Human Resources of Maternal, Child, and Family Health)

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 100

Emotion Regulation in Teens

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Field (Broad Category): Psychology (Social Sciences)

Student's Major: Psychology

Everyone regulates their emotions differently. High school students usually have a harder time with emotion regulation due to changing hormones and other environmental changes. This study investigates the different ways teens regulate their emotions and different mechanisms they use to do so. As well as looking at the associations between emotion regulation and different outcomes (e.g. depression, substance use) were examined. All participants were asked to take a survey that had items relating to their ability to regulate positive and negative emotions, their substance use, and levels of depression. Analysis indicated that teens who use less reappraisal to regulate negative emotions (thinking about negative event is a more positive way) and more often dampened positive emotions reported using more substances. Many emotion regulation strategies were related to teens' level of depressive symptoms. Teens who used more ineffective regulatory strategies with negative emotions (e.g. suppression, rumination, and venting) and positive emotions (dampening) and fewer effective strategies with negative emotions (e.g. problem solving reappraisal) reported more symptoms. Keywords: Emotion regulation, Substance use, depression, mood

Funding: Federal

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 101

Protocol for a Perinatal Weight Management Mobile Health Application

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Field (Broad Category): Public Health (Health Sciences)

Student's Major: Sport and Exercise Psychology

Studies have shown that excess body fat during pregnancy is associated with increased risk of pregnancy complications, gestational diabetes, hypertension, pre-eclampsia, and several fetal impacts. The American College of Obstetrics & Gynecology recommends preconception counseling for weight reduction. Guided imagery has shown promising results in studies that addressed weight management. Guided imagery is a multi-sensory and conscious experience that resembles the actual perception of some object, scene, or event but occurs in the absence of external stimuli. Most studies using guided imagery are limited in reach by the use of in-person delivery as guided imagery. Likewise, intensive procedures are common in studies involving perinatal weight management because they involve face-to-face interactions with study personnel. Digital interventions using guided imagery offer potential to reach large numbers of pregnant women and reduce participant burden. This study protocol uses guided imagery to help women with obesity and overweight manage weight gain during pregnancy. We developed a digital application, PregPal, that will be used over six weeks to expose overweight and obese pregnant women to guided imagery audio files designed to assist with behavior change for weight management. Formative efforts included interviews with pregnant women and mothers about their use of pregnancy applications which informed the design and user interface of PregPal. Feasibility indicators will include compliance with the protocol and participants views about the application while pre- and post-assessments will measure physical activity, food cravings, body image and depression/anxiety. After testing, we hope to disseminate PregPal to large numbers of pregnant women.

Funding: Federal (West Virginia Clinical and Translational Sciences Institute)

Program/mechanism supporting research/creative efforts: Independent Study Credit

Poster 102

Personality Traits Predict Well-Being in Adults Through Coping Methods

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Field (Broad Category): Psychology (Social Sciences)

Student's Major: Psychology

Among adults, individuals with higher well-being tend to also report better physical, mental, and emotional health. Studying the factors that contribute to well-being throughout adulthood can help to identify various risk factors and protective factors that are associated with the overall outcome of well-being. In particular, it seems that the Big 5 personality traits (openness, conscientiousness, neuroticism, extraversion, and agreeableness) may predict overall well-being by influencing other traits and developing a predisposition for certain behaviors. One such important behavior is coping. Individuals who utilize more successful coping strategies throughout their life tend to work through stress in more positive ways, leading to higher well-being. This study aims to determine if the Big 5 personality traits predict well-being through an individual's use of emotion-focused coping and problem-focused coping strategies. We are interested in determining the pathways through which personality predicts well-being and then investigating the specific facets of each pathway that are most significant. Our study uses archival data from the Midlife Development in the United States (MIDUS) longitudinal study. Personality traits were assessed using adjectival measures of the Big Five markers. Respondents were asked how much each of 25 adjectives described themselves on a scale ranging from 1 (not at all) to 4 (a lot) (see Prenda & Lachman, 2001). Coping methods and levels of well-being were assessed on similar scales, which were then used to create composite scores. Importantly, we controlled for all demographic variables. We are currently running correlation, regression, and mediation models through MPLUS for this project.

Funding: Institutional (Eberly College of Arts and Sciences)

Program/mechanism supporting research/creative efforts: Voluntary efforts

Poster 103

Immersive storytelling technologies: Increased presence, but neither engaged nor persuaded

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Field (Broad Category): Communications/Journalism/Public Relations (Media and Design)

Student's Major: Strategic Communication

As technologies evolve, scholars need to explore how this new technology can impact storytelling and audience engagement. This study explores immersive storytelling and the role it plays in increasing narrative engagement and presence in a story and impacting attitudes and behavioral intentions related to those messages. This study sampled 296 college students, who completed a preliminary questionnaire. The participants then made an appointment at the lab and were randomly assigned to view one of three narrative videos viewed on one of three different technologies: virtual reality with a head-mounted display (HMD), YouTube 360 video watched on a computer monitor, or a standard flat video viewed on a computer monitor. All three videos were related to recovery efforts in southern West Virginia after the major flooding. Post surveys were then administered. Data showed that HMDs produced the highest levels of presence in all three conditions, however, there was no association between presence and increase attitudes towards the victims featured. Narrative engagement was the only factor that impacted attitudes, which impacted the participants' willingness to offer support to victims. This study explores applications in cause marketing and a new way to connect with audiences through storytelling.

Funding: Institutional (Reed College of Media Public Interest Communication (PIC) Research Lab)

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 104

Influences of campus environment perceptions on physical activity of college students

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Field (Broad Category): Exercise Science/Physiology (Health Sciences)

Student's Major: Exercise Physiology

Objective: To examine the environmental influences across campus on physical activity levels among college students. **Methods:** Students at a large, Appalachian university completed a questionnaire on perceptions of health across campus. IPAQ scores were determined based on the sum of self-reported, weekly total physical activity. A healthy IPAQ score is 500-1000 MET-minutes/week, translating to 150 minutes/week of moderate intensity activity or 75 minutes/week of vigorous intensity activity, or a combination of the two. **Results:** Respondents (n=1758) had an average IPAQ score of 2259.07±1714.29 MET-minutes/week and were predominantly females (67.4%). Females had lower than average IPAQ scores (2061.32±49.99) and males had above average scores (2659±73.26), with significant difference ($p<0.0001$). When assessing influences on physical activity, the majority reported friends having a positive influence (56.96%), seeing people be physically active on campus (86.46%), feeling welcome to use the recreation center (74.47%), the center being open at convenient times (76.36%), the center having working equipment (88.44%), having club/intramural sports available (89.61%), and having plenty of options on campus to be physically active (75.39%). All variables had a significant influence on IPAQ scores in bivariate analysis ($p<0.01$ for all). **Conclusion:** Evidence suggests that friends' positive influence, feeling welcome, and having plenty of options all have a significant impact on physical activity of college students. This data can be used by campuses to tailor interventions in promoting physical activity among college students.

Funding: Institutional (WVU Experimental Station Hatch WVA00641)

Program/mechanism supporting research/creative efforts: Internship (for credit) with Olfert Research Lab

Poster 105

Training Variance Amongst Otolaryngologists Residents

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Field (Broad Category): Otolaryngology (Health Sciences)
Student's Major: Biochemistry

The experiences of Otolaryngology student residents are poorly documented in the medical community. Otolaryngology is a subsection within surgery that deals with the ear, nose and throat. The residence our survey focuses on are the surgical residents that perform surgery on cancerous diseases, also referred to as head and neck oncologists. We conducted a study to understand the training and preparations of these residents. The online survey was published on multiple websites, which have and still is being taken by residence from many different hospitals. This study will be used to educate Otolaryngologists on how other facilities train and prepare their residence. Similar surveys from other fields have found that the residency training systems were very similar. The preliminary results have shown likeness within programs and we are still compiling data from other surveys. The methods of these future surgeons should be similar to each other for the degrees of the surgery and we will use the survey to test the likeness.

Funding: Institutional (WVU)

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program

Poster 106

Investigating Potential Relationships between Preferred Listening Styles and Active-Empathic Listening Behaviors

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Field (Broad Category): Communication Studies (Social Sciences)
Student's Major: Communication Studies

Although listening is one of the primary functions in the communication process, there are few studies conducted to develop valid listening measures. However, within the last 15 years there have been two scales created to conceptualize and measure two listening constructs. These two constructs are an individual's active-empathic listening behaviors (i.e., sensing, processing, and responding) and an individual's preferred listening style (i.e., People, Content, Action, and Time). The following research project investigates if potential relationships exist between these two listening constructs, as well as if there are sex differences between them. The results of this study found that women scored higher on all active-empathic listening behaviors, as well as scoring higher on the people-oriented listening style than men, and that people-oriented listeners more frequently display active-empathic listening behaviors than content, action, or time-oriented listeners. The discussion section discusses the results in greater detail, explains the limitations of this study, and includes suggestions for future research projects involving these two listening scales.

Funding: Private (McConnell Chair Ambassadors Program)

Program/mechanism supporting research/creative efforts: McConnell Chair Ambassadors Program