12th Annual Student Research Day

Welcome to the twelfth annual Wilson College Student Research Day. Since I first arrived at Wilson College in 2014, Student Research Day continues to be my favorite day of the academic year. The research presented, both undergraduate and graduate, is the culmination of the academic experience at Wilson College. Everything students have learned at Wilson— writing papers, debating issues, conducting field work, researching topics, creating art, making lab discoveries —comes together in these capstone presentations.

At Wilson, students are exposed to a broad-based curriculum that links the sciences, arts, humanities and social sciences. They learn to think critically and ask questions, review literature, gather and synthesize information, solve complex problems and communicate their findings effectively. Research is where students put their academic training into action. Today we see the benefits of the liberal arts on full display.

Research at Wilson is most often a student-initiated process, driven by individual intellectual curiosity and interest. Students conduct original research and explore their findings under the guidance of faculty advisers who also serve as mentors, encouraging students to contribute to the scholarly discussions in their fields. This student-faculty collaboration is a hallmark of the Wilson experience.

This year we have more than 120 students representing multiple disciplines presenting research covering a variety of topics. While the concurrent schedule makes it impossible to see all our presenters, I encourage you to explore your intellectual curiosities by attending as many presentations as possible.

Elissa Heil
Vice President for Academic Affairs, Dean of the Faculty

SCHEDULE OF EVENTS

Library Zoom Room: Oral Presentations
Virtual

8:50–9 a.m. Welcome Address – **Wesley R. Fugate**, *president*

9–9:50 a.m. **Sarah Schaffner '21** (p.2)
Seasonal Biodiversity of Insects in Warm Season and Cool Season Grasses
Ciera Erwin '21 (p.3)
Societal Demands
Luis Gonzalez Ayala '21 (p.4)
From Darkness to Hope: A Journey

10–10:50 a.m. **Elsa Tabaku '21** (p.5)
The Influence of Culture on Breast Cancer in U.S. Hispanics

Olivia Shirk '21 (p.6)
Presentation on an Excerpt of a Macabre Epic

Trisha Grove '21 (p.7)
A Step Into the Darkness

11–11:50 a.m. **Danielle Stafford '21** (p.8)
Galapagos Islands: Ecotourism

Madison Smith '21(p.9)
Comparing Water Quality of Two Sites on Middle Spring Creek in Shippensburg, Pa., Using Chemical, Physical, and Biological Means

Blanca Villeda '22 (p.10)
Analyzing Regulations for Bottled Water Quality in the United States and Regulations for Bottled Water Extraction in California, Pennsylvania, Texas, and Washington

1:30–2:20 p.m. **Cierra Beaver '21** (p.11)
The Effects of Stress and Anxiety on College Students' Substance Craving and Use

Christina Dobbins '21 (p.12)
Effects of Work Environment and Other Factors on Warehouse and Office Employees' Job Satisfaction

Ivy Torres '21 (p.13)
Attachment Styles and Coping Mechanisms in Adoptees

Science Center Zoom Room: Oral Presentations
Virtual

8:50–9 a.m. Welcome Address – **Elissa Heil**, *vice president for academic affairs, dean of the faculty*

9–9:50 a.m. **Elsa Tabaku '21** (p.14)
Ceramide and Azacytidine in Combination as an Alternative Treatment for Triple-Negative Breast Cancer

Cheyenne Yoder '21 (p.15)
The Potential Role of Freshwater Mussels as Indicators of Bacterial Levels in Their Environment

Emma Holiday '21 (p.16)
L-Selectins and Their Ligands: Potential Applications for Improving Fertility in Domestic and Endangered Ungulates

10–10:50 a.m. **John Sollenberger '21** (p.17)
Cannabidiol as a Therapeutic Alternative for Treating Systemic Lupus Erythematosus

Daphne Buzard '21 (p.18)
University Professor Guilty of Tax Fraud

Lauren Monahan '21 (p.19)
The Social Behavior of Translocated African Elephants, Loxodonta Africana into the Sera Wildlife Conservancy in Northern Kenya

11–11:50 a.m. **Brooke Barnhart '21** (p.20)
The Potential Use of Lemongrass (Cymbopogon Citratus) Essential Oil to Modulate the Contents of the Gut Microbiome: A Literature Review

Tiffany Carver '21 (p.21)
The Effects of Taurine Supplementation With a Grain-Free Diet on Cardio Health in Canines

Megan Morningwake '20 (p.22)
Overexpression of the Eyes Absent Gene, EYA1, in Retinoblastoma: A Potential Therapeutic Target

1:30–1:50 p.m. **Taylor Baker '20: Honors** (p.23)
The Effects of Environmental Stress on the Equine Immune Response to Sarcocystis Neurona and the Development of Equine Protozoal Myeloencephalitis

1:55–2:15 p.m. **Nicholas Beitzell '21**: Honors (p.24)
Modeling Rogue Waves

2:20–2:40 p.m. **Daniel O'Keefe '21**: Honors (p.25)
The Socialization of Attraction: Connections Between One's Sociocultural Environment and the Development of One's Sexual/Romantic Self

2:45–3:05 p.m. **Kelly Cormier '21**: Honors (p.26)
The Effect of Unmounted and Mounted Equine Activities on Self-Esteem and Self-Efficacy

3:10–3:30 p.m. **Jessica Rice '21**: Honors (p.27)
The Effects of a Pandemic on the Mood of a Campus of a Small Liberal Arts College

disert scholar

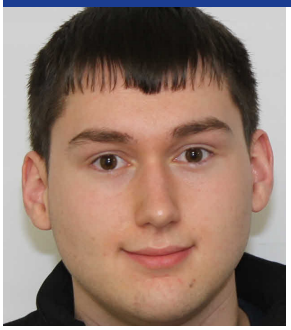
3:35–4:05 p.m. **Nicholas Beitzell '21** (p.1)
The How and Why of Cassatt and Tanning, A Synthesis of Three into One

Poster Session - All Day

View the Powerpoint presentation on-demand (posted on the Portal SRD page), including posters from these classes:

BIO 207 — Vertebrate Physiology
BIO 306 — Immunology
BIO 398 — Design and Methods of Scientific Research
CHM 398 — Design and Methods of Scientific Research
ESS 340 — Kinesiology & Applied Anatomy
HIS 399 — History Senior Thesis
HSC 216 — Human Anatomy and Physiology II
NUR 404 — Senior Practicum

DISERT SCHOLAR PRESENTATION



Nicholas J. Beitzell '21

Dual Major: Mathematics & Studio Art
Minor: Philosophy
Activities: Academic Support Center Math Tutor

Faculty Adviser
Robert K. Dickson, Professor of Fine Arts

Major Advisers
Deborah Austin, Professor of Chemistry
Philip Lindsey, Professor of Fine Arts

The How and Why of Cassatt and Tanning, A Synthesis of Three into One

This project is a synthesis of the painting and printmaking styles and manners of Mary Cassatt, Dorothea Tanning, and Nicholas Beitzell into one through the catalyst of practice-based research under the time-honored tradition of the copyist. To accomplish such achievements, knowledge of the selected artists' methodological leanings and mindsets that drove these choices were necessary.

This project's research and production steps consist of four: the artist's selections; literature review, analysis; reproduction, exemplars; and artwork synthesis productions. This synthesis has resulted in a range of fourteen original embodied artworks and a style guide demonstrating the internalization of these artists' approaches. My artwork tends to be narrative-based, and I saw Cassatt and Tanning fundamentally acting as guides toward incorporating their style and manner with my own to create original works that demonstrate an internalization of their influence.

The goal is that once learned, this will open new doors of possibilities to explore. The project's effect is evident in the final pieces as three different mindsets become one. The project shows just the beginning of where the lessons from Cassatt and Tanning will take me. I have profoundly changed in selecting narratives and rendering them the doors that lie ahead I am eager to open.

ORAL RESEARCH PRESENTATION

Sarah Schaffner '21

Major: Animal Studies (BIO/PSY Concentration)
Specialization: Conservation Studies and Biology
Activities: Nerd Crew, Curran Scholar, Plant Club, and Diversity Team Volunteer

Adviser
M. Dana Harriger (1) and James McNeal (2)
(1) Integrated Sciences Division Chair, Wilson College and (2) Smithsonian-Mason School of Conservation, George Mason University

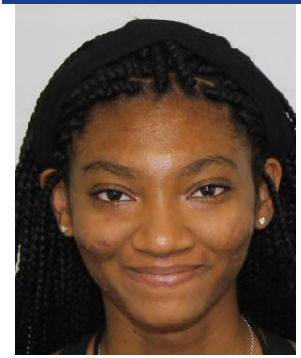
Seasonal Biodiversity of Insects in Warm Season and Cool Season Grasses

In all ecosystems, invertebrates make up many animals in the systems. However, there are different interactions between the plants in the system and the way in which insect invertebrates inhabit systems.

In the spring and fall of 2020, two surveys were conducted of the Smithsonian Conservation Biology Institute's Racetrack Hill comparing the warm-season grass and the cool-season grass insect assemblages. These samples were examined and taken down to the family taxon level to further understand biodiversity of the insects and correlations between the native and non-native grass types.

By understanding how the primary producers, plants, and insect invertebrates interact with one another, more informed land management practices can be implemented, and a stronger understanding of winter insect assemblages can be made.

ORAL RESEARCH PRESENTATION



Ciera Erwin '21

Major: Graphic Design with Photography Certification
Minor/Certification: Dance
Faculty Adviser: Philip Lindsey, Professor of Fine Arts
Clubs and Extracurriculars: BSU, Orchesis

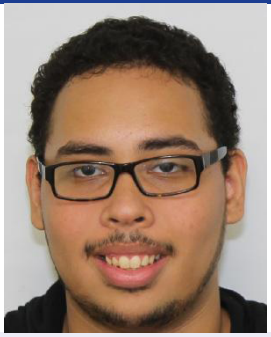
Adviser
Phillip Lindsey, Professor of Fine Arts

Societal Demands

For this series, I am using graphic design and photography to explore social constructions and gender norms that have created personal insecurities, anxieties, and vulnerabilities. This will be done through the incorporation of image and text. I chose the project because it interests me but also because it has helped me dissect my identity and acknowledge why I am the way I am.

The project was inspired by personal experience and hearing opinions and views on women. The work is informed and influenced by what is shown in media such as graphic design, film, television, print, and social media. I want my audience to reflect on social constructions, gender norms, why they might have a particular viewpoint, and to consider existing outside of the norm. Because this project is inspired by personal experience, it is difficult to discuss in regular conversation. With some understanding of the functions of art and the inspiration of other artists over the past several months, I challenged myself to see how vulnerable I could be in front of an audience. By exploring contexts of insecurity, anxiety, depression, confusion, and vulnerability, I am hoping to inspire others to consider existing outside of social constructions and gender norms.

ORAL RESEARCH PRESENTATION



Luis M. Gonzalez '21

Major: Graphic Design with Photography Certification
Minor: Communications
Activities: Billboard, InterVarsity Bible Study

Adviser
Phillip Lindsey, Professor of Fine Arts

From Darkness to Hope; A Journey

My work as an artist frequently explores themes of growth, hope, perseverance, as well as ethnic and cultural pride. Past life experiences of uncertainty, deception, fear, or trauma often function as journeys of truth, transforming a perceived weakness into lessons of strength and soothing unpleasant memories.

As a result, the concepts, ideas, and experiences from my time in college have not only shaped my work as a designer but also influenced the kind of person I have become and how I cope with the past.

ORAL RESEARCH PRESENTATION

Elsa Tabaku '21

Major: Biology & Spanish
Activities: President of Muhibbah Club, BSU, Spanish Club, Spanish Tutor

Adviser
Dana Harriger, Professor of Biology & Amanda McMenamin, Associate Professor of Spanish

The Influence of Culture on Breast Cancer in U.S. Hispanics

Breast cancer is the most common type of cancer diagnosed among Latina women in the United States and the fifth leading cause of cancer-related mortality in the world. It has a lower incidence in the Hispanic population in the U.S. than among non-Latinos, but a higher mortality rate.

The purpose of this study is to see how culture positively and negatively affects the Hispanic population when it comes to health issues, particularly breast cancer. There are positive reasons why Hispanic patients are affected less by breast cancer. These relate to lifestyle factors such as weight management, age when they first gave birth, the number of children they have, and how long they have breastfed.

Negative factors linked to higher mortality that this study looks into are the lack of access to health care the Hispanic population faces, the language barrier, the lack of information and also low socioeconomic status. There are also problems with continuity of care. The lack of family history is a major factor in why breast cancer is caught in more advanced phases among Hispanic women.

In particular, I will focus on lower income and insurance levels among a population with far less education about how genetic testing would help to catch the presence of breast cancer earlier rather than later. If more healthcare providers were to speak Spanish and directly connect with Hispanic patients and their culture, and provide access to health care information early in life, for example, in schools, it would prevent the poor outcomes of breast cancer in the Hispanic population and break the taboo of talking about it.

ORAL RESEARCH PRESENTATION

Olivia Shirk '21

Major: Creative Writing
Activities: Plant Club (member), Drama (president), Societas (president), DiversiTones (president), WAAG (officer), CAB (member)

Adviser
Michael Cornelius, Professor of English

Presentation on an Excerpt of a Macabre Epic

This epic has been many years in the making, beginning well before the author's college career. After undergoing fundamental changes, this story uses macabre tropes with strong female characters to follow the story of a young woman and her brother in 1980s London as they try to navigate schooling, traffic, a vampire trying to save them, and a murderous vampire that has been hunting their family down since ancient times.

ORAL RESEARCH PRESENTATION

Trisha Grove ’21

Major: Creative Writing
Minor: Communications
Activities: Co-Editor of The Bottom Shelf Review

Adviser
Michael Cornelius, Professor of English

A Step Into the Darkness

The poems in the collection "A Step Into the Darkness" take readers to a darker side of things in life. They tell of situations relating to violence, horror, and even death. The poems in this collection give a glimpse into situations readers rarely think about when it comes to poetry.

The poems in the collection "A Step Into the Darkness" are written in rhyme and meter. The poems in this collection are influenced by the rhyming and meter of Robert Frost but go in far darker places than he ventured to go.

ORAL RESEARCH PRESENTATION

Danielle Stafford '21

Major: Health Science & Environmental Sustainability
Minor: Psychology, Applied Ethics, & Religious Studies
Activities: Resident Assistant, Class President, Curran Scholar, Student-Athlete Mentor (SAM), and Student-Athlete Advisory Committee (SAAC)
Athletics: Women's Soccer and Lacrosse

Adviser
Tonia Hess-Kling, Assistant Professor of Exercise & Sports Science
Edward Wells, Professor of Environmental Studies

Galapagos Islands: Ecotourism

The Galapagos Islands is the origin of the ideology of ecotourism. For habitats to be supported by ecotourism, it needs to follow these principles: minimal ecological impact, awareness and respect, improved financing, and it should give visitors an overall positive experience (Outpost 2014). Many of these aspects are focused on education, rules, and regulation.

Ecotourism is making a significant impact on the environment without impacting an individual's visit. On the other hand, there have been controversies that have individuals thinking ecotourism has more negative consequences.

ORAL RESEARCH PRESENTATION

Madison Smith '21

Major: Spanish & Education
Activities: Spanish Club (president), Learning Campus

Adviser
Amanda McMenamin, Associate Professor of Spanish

Comparing Water Quality of Two Sites on Middle Spring Creek in Shippensburg, Pa., Using Chemical, Physical, and Biological Means

It is important to routinely monitor the health of local waterways to ensure that they meet the requirements such as those set by the Clean Water Act (CWA). This is to help maintain the overall health of the environment and the safety of human health by having access to clean water.

The local waterway used in this study was Middle Spring Creek which runs right through Shippensburg, Pa. Two sites were chosen: an upstream site on the outskirts of the town, and a downstream site in downtown Shippensburg.

The objective of this study was to estimate the stream health of both sites and see if there was a noticeable difference between the upstream and downstream sites. Assessing the water quality was done using chemical, physical, and biological means. Chemical means involved conducting water quality tests such as pH, ammonia, nitrate, and nitrite. A physical assessment was done onsite by surveying the land and noting how the land around the sites was used. The biological assessment consisted of placing leaf packs at each for two weeks, and an EPT index was calculated from the data collected.

The hypothesis was that the more downstream site located downtown would have lower water quality as characterized by a lower EPT index and higher levels of nutrients and could be due to urban runoff. Further research can be done in helping identify possible sources as well as discussing practices that can be done to maintain appropriate water quality.

HONORS RESEARCH PRESENTATION

Blanca Villeda '22

Major: Environmental Science & Chemistry
Activities: Muhibbah Club, Best Buddies

Adviser
Edward Wells, Professor of Environmental Studies

Analyzing Regulations for Bottled Water Quality in the United States and Regulations for Bottled Water Extraction in California, Pennsylvania, Texas, and Washington

Bottled water is defined as "water that is intended for human consumption and that is sealed in bottles or other containers with no added ingredients except that it may optionally contain safe and suitable antimicrobial agents" (FDA, 2020). Bottled water can come from many sources. However, the Food and Drug Administration (FDA) classifies bottled water by its origins, such as springs, well water, and even municipal water source (FDA, 2019). Although bottled water could be treated municipal water, either via ozonation, reverse osmosis, or some other method, most bottled water (over 50%) comes from springs (Lurie, 2014).

Many regulations on the quality of bottled water have been implemented. However, regulations on the quantity that can be withdrawn from freshwater resources have not (Boldt-Van Rooy, 2018). It is up to the states to place regulation of water that can be extracted from the freshwater resources within their boundaries; states play an important role in regulating bottled-water industry water withdrawals (Ford-Stille, 2020), and these regulations vary from state to state.

In states where water is being extracted for bottled water purposes, residents and environmental groups have raised concerns about issues including harm to local fisheries and the minimal compensation paid to local communities and governments, compared to the high volumes of water being extracted (Jafee & Newman, 2012; Brown 2020). Residents argue that bottled water companies are not paying enough for the common resource they are bottling and selling elsewhere, and the environmental effects this process is having on the local environment.

In this paper, I will attempt to analyze bottled water extraction regulations and practices in four states: California, Washington, Texas, and Pennsylvania. There is not one regulation that will work best for all states; each state has different resources and ways to manage these resources. However, regulations in states should be updated to reflect the effect of climate change and the ongoing social pushback of community groups, and the regulations in place should be better enforced.

ORAL RESEARCH PRESENTATION

Cierra Beaver '21

Major: Psychology

Thesis Adviser
Keri Kytola, Assistant Professor of Psychology

Adviser
Steven Schmidt, Associate Professor of Psychology

The Effects of Stress and Anxiety on College Students' Substance Craving and Use

Previous research has shown that academics, finances, sleeping patterns, family relations, and career issues such as work hours are increasing college students' stress and anxiety levels (Morey & Taylor, 2019). Although studies have identified substances college students use to cope with these stressors, no prior studies have examined the extent to which task difficulty is related to college students' self-reported levels of stress and anxiety, and in turn, their self-reported craving to use a substance.

Thus, the purpose of the present study was to determine how tasks that varied in difficulty (e.g., easy versus hard) impacted college students' stress and anxiety levels, and as a result, their cravings for alcohol, nicotine, and marijuana. Participants were recruited from Wilson College, and were pre-screened to make sure that they met the substance use inclusion criterion (i.e., that they report having used/use alcohol, nicotine, or marijuana). Next, they filled out a demographic questionnaire, a short substance preference and craving questionnaire, and separate stress and anxiety surveys. Participants were then randomly assigned to complete a set of 10 easy or hard SAT-type questions. Lastly, they filled out the same stress and anxiety surveys followed by the craving questionnaire.

It was hypothesized that participants who completed the hard task would experience greater levels of stress and anxiety, and thus report higher substance use cravings than those who completed the easy task. A mediation model will be used to examine this hypothesis once data collection is finished. The findings and limitations of the present study will be discussed.

ORAL RESEARCH PRESENTATION

Christina Dobbins '21

Major: Psychology

Thesis Adviser
Keri Kytola, Assistant Professor of Psychology

Adviser
Steven Schmidt, Associate Professor of Psychology

Effects of Work Environment and Other Factors on Warehouse and Office Employees' Job Satisfaction

Industrial and organizational (I/O) psychology and research have seen a growing interest over the last several decades. One of the most extensively researched subjects in this field is job satisfaction and the factors that influence it.

Past studies have shown that factors such as poor leadership styles (Chen et al., 2014; Rae, 2014) and the type of work environment (Fassoulis et al., 2015; Otterbring et al., 2018) can negatively impact job satisfaction. However, comparing job satisfaction across industries is not as well researched, and studies have yet to identify if the factors that influence job satisfaction are consistent from one occupational setting to another.

The purpose of this study was to identify which factors contributed to overall job satisfaction in a warehouse setting versus an office setting. Participants were warehouse workers and Wilson College staff members located in central Pennsylvania and surrounding areas. Data was collected using the Job Satisfaction Survey that consists of 36 questions and has nine subscale scores that include pay, promotion, supervision, fringe benefits, contingent rewards, operating conditions, co-workers, nature of work, and communication (Spector, 1994). Analyses will be run to test the differences between groups using an independent samples t-test on all nine subscales and overall job satisfaction.

The results, along with the implications and limitations of this research, will be discussed.

ORAL RESEARCH PRESENTATION

Ivy Torres '21

Major: Psychology
Minor: Sociology
Activities: Muhibbah Club

Adviser
Steven Schmidt, Associate Professor of Psychology

Attachment Styles and Coping Mechanisms in Adoptees

Attachment styles are determined in infancy with the relationship between a mother and baby. If a mother is attentive, her baby will most likely form a secure attachment style. Whereas if a mother is neglectful, her baby will most likely form an insecure attachment. In adoption, a baby is given away to the state, where they would either be put into foster care or a new family.

In this study, adoptees and non-adoptee will be compared to see if there is a difference in their attachment styles and in their coping skills. In theory, an adult adoptee should have a different, more insecure attachment style and a harder time coping in everyday life than a person who is not adopted.

In the past, studies have shown that adoptees tend to have a greater likelihood of being diagnosed with mental illness due to the fact they were adopted. Additionally, these studies mention coping styles and attachment styles and how adoptees tend to have a greater likelihood of an insecure attachment style and use more avoidant-type coping methods.

Studying further into these two areas might help get a better understanding of how the adoption process affects those involved. With this knowledge, future researchers might be able to figure out what type of counseling would be best for an adoptee.

Using a correlational and a quasi-experiment, 32 adoptees and 15 non-adoptees were given two questionnaires, Brief COPE and Measure of Attachment Qualities, to determine if there is a difference. An independent samples t-test will be used to test the hypothesis that adoptees have a greater likelihood of having an insecure attachment and use more avoidant-type coping methods than non-adoptees.

ORAL RESEARCH/POSTER PRESENTATION

Elsa Tabaku '21

Major: Biology & Spanish
Activities: President of Muhibbah Club, BSU, Spanish Club, Spanish Tutor

Advisers
Dana Harriger, Professor of Biology
Amanda McMenamin, Associate Professor of Spanish

Ceramide and Azacytidine in Combination as an Alternative Treatment for Triple-Negative Breast Cancer

Triple-negative breast cancer (TNBC) is a subtype of breast cancer defined by the lack of expression of estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor 2 (HER2) proteins. It represents approximately 10–15% of breast cancers and has a poor prognosis and very limited treatment options.

Chemotherapy is one of the most common treatment options being used to treat breast cancer, including TNBC, but the effective dosages often cause damage to healthy cells and tissues. Azacytidine (AzaC) is one commonly used chemotherapeutic drug which functions as a demethylation agent to reduce growth and proliferation of cancer cells. Ceramides (CER) are bioactive lipids that function as tumor suppressors, regulating cell proliferation, differentiation, senescence, and apoptosis. Both of these agents have shown to be an effective treatment when used on other subtypes of breast cancer.

In this literature review, the potential efficacy of a combination of these chemotherapeutic drugs on TNBC is explored. It is proposed that AzaC and CER combined may induce higher rates of cancer cell apoptosis than either agent alone while having no effect or minimal negative effect on the healthy cells,and the combined approach would suggest an improvement to current treatment for TNBC.

ORAL RESEARCH PRESENTATION

Cheyenne Yoder '21

Major: Biology
Minor: Psychology

Adviser
Brad Engle, Associate Professor of Biology

Short-term Characterization of a Biofilm in a Free-flowing Freshwater Creek in South-central Pennsylvania

Water is an important public resource threatened by pollution such as wastewater contamination, agricultural runoff, and chemical waste. Bioindicators, organisms used to assess the quality of an environment and its changes over time, are an important method of measuring and monitoring water quality.

Because they are directly affected by environmental pollution, bioindicators can sometimes serve as a more sensitive means of assessing water quality than chemical or physical tests. Due to their ability to filter large quantities of water, bivalves, such as mussels, are potential candidates for bioindicators. Bivalves may also provide a means of continuous water monitoring because they are sessile organisms and have the potential to filter and retain particles for long periods of time.

The use of bivalves as bioindicators of the bacteria Escherichia coli would help with efforts to monitor water quality for public health. E. coli is found in the lower intestines of warm-blooded organisms and in fecal matter. It is transferred to water bodies via agricultural runoff, waste from sewage overflows and polluted stormwater runoff. E. coli can cause urinary tract infections, respiratory illnesses including pneumonia, and bacterial gastroenteritis.

This review suggests bivalves may be a useful tool for assessing bacteria levels and that Elliptio complanata, the Eastern Elliptio mussel, may be an effective bioindicator of potential sources of E. coli contamination in the Conococheague Creek within the Potomac Watershed.

ORAL RESEARCH/POSTER PRESENTATION

Emma Holliday '21

Major: Biology
Minor: Conservation Studies & Chemistry
Activities: Pre-vet Club, Archery Club

Thesis Advisers M. Dana Harriger1, Abigail Maley1 and Budhan Pukazhenthi2
1 Wilson College, Integrated Sciences Division, 2 Center for Species Survival, Smithsonian Conservation Biology Institute
Adviser Deborah Austin, Professor of Chemistry

L-Selectins and Their Ligands: Potential Applications For Improving Fertility in Domestic and Endangered Ungulate

Rising global extinction rates have prompted conservationists to seek out new strategies to combat declining populations of endangered species. Improving the reproduction of captive populations is a critical area of research that has led to the development of assisted reproductive technologies (ART) such as in-vitro fertilization (IVF) and embryo transfer.

While ART has many benefits for endangered species, it is an expensive and labor-intensive process that can yield poor results. The ability to pre-determine which individuals are most likely to be receptive to ART may improve the success rates of establishing a pregnancy. L-Selectin, a biomarker for fertility, may provide important insights about the implantation process, repeat implantation failure, and be used to predict an individual's fertility status to determine the best candidates for ART.

Studies in humans demonstrate both the role L-selectin and their ligands play in the implantation process as well as the interactions that occur between the blastocyst and endometrium during implantation. Studies in domestic livestock and non-domestic ungulate species reveal the current success rate of IVF and embryo transfer and summarizes the incidence of early embryonic loss in ungulate species. There is a lack of information, however, regarding the efficacy of L-selectin ligand screening for fertility status in equine species.

These findings demonstrate the need to construct a methodology for determining the best candidates for embryo transfer that can be applied to the domestic horse (Equus ferus caballus), and, ultimately, the endangered Przewalski's horse (Equus ferus przewalskii). Future applications of L-selectin ligand screening in other endangered species will also be discussed

ORAL RESEARCH PRESENTATION

John Sollenberger '22

Major: Biology

Thesis Advisers
M. Dana Harriger, Professor of Biology
Abigail Maley, Assistant Professor of Biology

Adviser
M. Dana Harriger, Professor of Biology

Cannabidiol as a Therapeutic Alternative for Treating Systemic Lupus Erythematosus

Systemic Lupus Erythematosus (SLE) is a chronic inflammatory disease that currently has no cure and current treatment options include many harmful side effects. SLE is generally hard to diagnose and causes chronic inflammation and pain throughout the body. Signs of SLE range from a butterfly-like redness around one's face to elevated peripheral cell counts, and swelling of affected organs.

Individuals diagnosed with SLE are most commonly prescribed the steroidal drug Prednisone which can cause adverse side effects. Cannabidol (CBD) is a chemical extracted from the cannabis plant that has no known psychoactive side effects and has reported anti-inflammatory effects with no harmful side effects when used by humans. CBD is available as an over-the-counter grade and through a prescription for medical grade. Over-the-counter grade CBD is typically infused with oil which can persist after distillation. Medical grade CBD involves winterization followed by a distillation, leaving more CBD and less of the chemicals used in the extraction process.

Current findings indicate both forms of CBD have anti-inflammatory properties, but the difference in purity has not been tested. Understanding if differences in purity have an effect on suppressing inflammation is important to ensure lower quality CBD is a safe treatment option and ensure the medical-grade CBD is more effective in its healing properties. Results could suggest using CBD as a treatment option could supplement and/or minimize the reliance on medications like Prednisone with fewer adverse side effects.

ORAL RESEARCH/POSTER PRESENTATION

Daphne Buzard '21

Major: Accounting
Minor: Business
Activities: Tutor, Curran Scholar, Class Treasurer
Athletics: Softball 2017 - 2020

Adviser
Joseph Cunningham, Associate Professor of Accounting

Case Study: University Professor Guilty of Tax Fraud

The overall purpose of the case study is to investigate and understand an example of how tax fraud can be committed and the impact of committing tax fraud.

The design of the case study is by examination of both the legal documents and contemporaneous reports surrounding the crimes committed by Dr. Quingyun Sun.

Sun, a former West Virginia University professor, plead guilty to wire fraud and tax fraud. He was sentenced in December 2020 for fraudulently filing his 2014 U.S. tax return. The case not only examines the legal issues and punishment of Dr. Sun's crimes but the ethical and professional impact as well.

ORAL RESEARCH PRESENTATION

Lauren Monahan '21

Major: Biology
Minor: Conservation Studies & Dance
Activities: Orchesis

Thesis Advisers M. Dana Harriger1, Abigail Maley1 and Shifra Goldenberg2
1Wilson College, Integrated Sciences Division and 2 Conservation Ecology Center, Smithsonian Conservation Biology Institute
Adviser Deborah Austin, Professor of Chemistry

The Social Behavior of Translocated African Elephants, Loxodonta Africana into the Sera Wildlife Conservancy in Northern Kenya

Conservation translocation, the deliberate movement of animals from one location to another, is an approach used in conservation for a number of conservation objectives. Translocation can affect the social relationship of a species and is an essential factor for many species ranging from learning maternal or family bonds to establishing territorial relationships between neighbors.

Research indicates that African elephants, Loxodonta Africana, rely on social bonds for survival. Elephants are often translocated to help with their fight against drought and poaching. It is unknown if translocation is affecting these social bonds which is then leading to an unsuccessful reintroduction and negatively affecting that animal's survival.

This study will determine if orphaned calves cooccur with wild elephants after being released into a wildlife sanctuary in northern Kenya. The occurrences are measured through camera traps and observing when orphaned elephants are present with wild elephants at watering holes. Each elephant is individually identified to also determine who the orphans recreated bonds with, if at all. Camera traps allow for limited human presence, which could impact any elephant interactions. Each image and video are scored to determine which of the ten orphans are cooccurring with the wild elephants. Preliminary analysis suggests that female elephants are able to recreate social bonds when a family member dies, but it is unknown if the human interaction and removal of the orphans from the sanctuary affect this ability.

Results of this study will help determine whether and which reintroduced orphaned elephants are cooccurring with wild elephants to fulfill the social relationships they lack. Future studies could compare the released animals' social interactions over a more extended period of time. This approach will show if the released elephants are becoming more socially integrated over time.

ORAL RESEARCH/POSTER PRESENTATION

Brooke Barnhart '21

Major: Biology
Minor: Psychology

Advisers
Kathryn Sarachan, Assistant Professor of Chemistry
Adam Cooke, Lecturer/Research Advisor

The Potential Use of Lemongrass (Cymbopogon citratus) Essential Oil to Modulate the Contents of the Gut Microbiome: A Literature Review

The gut microbiome plays a significant role in nutrient metabolism, maintenance of the structural integrity of the gut mucosal barrier, and protection against pathogens. There is a great number of different species that contribute to the importance of the gut microbiota in mammals.

While research into the composition and role of the gut microbiota is ongoing, there are known links between the gut microbiome and mood, mental health, autoimmune diseases, endocrine disorders, skin conditions, and cancer. The microbiome can be disrupted by parturition, breast-feeding, medications (including antibiotics), and diet. Certain dietary supplements may be used to support a balanced gut microbiome and improve general health.

Lemongrass essential oil is known to have antibacterial properties, prevent wound infection, and provide protection against damage in the stomach. While essential oils have been growing in popularity, little research has been done to investigate the effects of essential oils, including lemongrass essential oil, on the gut microbiome.

Research in this area is required to determine whether essential oils can be used as a dietary supplement. A dietary supplement of lemongrass essential oil may impact gut microbiome by possibly decreasing certain concentrations of bacteria more significantly than others with its antibacterial and antifungal properties.

ORAL RESEARCH PRESENTATION

Tiffany Carver '21

Major: Biology

Advisers
Deborah Austin, Professor of Chemistry
Abigail Maley, Assistant Professor of Biology

The Effects of Taurine Supplementation with a Grain-Free Diet on Cardio Health in Canines

Dilated cardiomyopathy (DCM) is a type of heart disease that affects the muscle of the heart causing it to thin and resulting in the enlargement of the left ventricle. If DCM is left unresolved, it can result in congestive heart failure.

In the past decade, cases of DCM in canines have increased dramatically. The growing popularity of grain-free canine diets has been suggested as a possible contributor to this increased prevalence of DCM. These diets typically contain very low levels of the amino acid taurine. Taurine is a sulfur amino acid that plays a role in the calcium pools within the cardiac cells that are responsible for proper contractions of the heart.

Grain-free diets typically have a reduced amount of animal by-product, which is the main source of taurine in conventional canine diets, and are generally rich in legumes, such as lentils and peas, which are low in sulfur amino. Legumes also contain a high content of fermentable carbohydrates, which leads to a gastrointestinal loss of taurine.

Although some evidence links grain-free diets and taurine deficiency, results are contradictory and more research is needed to investigate the potential mechanism by which grain-free diets may contribute to DCM. Additionally, switching from a grain-free to a taurine-rich diet has the potential to reverse symptoms of DCM.

Understanding the role diet and taurine may play in DCM in canines is important for maintaining the health of dogs in their roles as companions, therapy, and service animals.

ORAL RESEARCH/POSTER PRESENTATION

Megan Morningwake '21

Major: Biology
Minor: Chemistry
Activities: EFT Volunteer

Advisers
Brad Engle, Associate Professor of Biology
Kathryn Sarachan, Assistant Professor of Chemistry
Adam Cooke, Lecturer/Research Advisor

Overexpression of the Eyes Absent Gene, EYA1, in Retinoblastoma: A Potential Therapeutic Target

Retinoblastoma is one of the most common and deadly cancers in children under three years of age. Worldwide, 9,000 children are diagnosed annually with hereditary retinoblastoma, with a 70% mortality rate in the middle- and low income countries. The treatments for retinoblastoma (chemotherapy, radiation, and removing the eye) all have serious side effects.

At any stage of diagnosis, the goals of treatment should be saving the child's life, preserving as much vision as possible, and minimizing the damage to noncancerous cells. This could potentially be accomplished by targeting specific genes or gene products that are known to be overexpressed in many cancers. Some genes are upregulated during development; however, they are also upregulated in cancer cells leading to tumor progression and carcinogenesis. The EYA1 gene is a critical developmental gene and its gene, product functions as a protein phosphatase and as a coactivator of the SIX/EYA transcriptional complex; it has been shown to be overexpressed in several cancers.

In this literature review, the upregulation of the EYA1 gene and its gene product are explored as possible therapeutic targets specific to retinoblastoma cancer cells, opening the door to the possibility of developing targeted therapies that could prove a viable option that will be less invasive to young children and be more effective in treating retinoblastoma.

ORAL RESEARCH PRESENTATION

Taylor Baker '21

Major: Biology
Minor: Animal Studies
Activities: Work at a Horse Barn, Horseriding, Dog Walking

Advisers
Brad Engle, Associate Professor of Biology
M. Dana Harriger, Professor of Biology

The Effects of Environmental Stress on the Equine Immune Response to Sarcocystis Neurona and the Development of Equine Protozoal Myeloencephalitis

Pennsylvania's horse racing industry generates over $300 million annually providing nearly 4,000 jobs. Improving equine welfare, particularly within Thoroughbred racing, is within the state's best interest since Thoroughbreds typically have the highest number of Equine Protozoal Myloencephalitis (EPM) cases.

EPM, a neurological condition, can develop in horses exposed to the parasite Sarcocystis neurona (S. neurona). Equines contact S. neurona when grazing or drinking from areas contaminated by opossum feces leading to the development of symptoms or debilitating complications in the equine host. Antemortem diagnosis is difficult due to the parasite's ability to infect any part of the central nervous system, the wide variation within an individual's immune response, and current diagnostic tests only being able to confirm exposure to S. neurona.

Approved drug treatments have less than a 50% success rate and only leave the horse pasture sound. Stress is considered a risk factor as increased cortisol production can suppress the immune system, leaving horses more vulnerable to pathogen accumulation. The equine stress response is commonly assessed by salivary or serum cortisol analysis.

Previous studies have indicated that the racetrack environment causes stress among equines due to the intense exercise routines, increased stall confinement, and lack of social interaction. Limited research has been conducted to understand if this increased stress in racehorses has had any negative health consequences.

This literature review aims to determine whether the stress related to racetrack environments inhibits a Thoroughbred's ability to produce S. neurona antibodies, leaving them more susceptible to EPM development.

ORAL RESEARCH/POSTER PRESENTATION

Nicholas J. Beitzell ’21

Dual Major: Mathematics & Studio Art
Minor: Philosophy
Activities: Academic Support Center Math Tutor

Faculty Adviser
Alexander Munson, Associate Professor of Mathematics

Major Advisers
Deborah Austin, Professor of Chemistry
Philip Lindsey, Professor of Fine Arts

Modeling Rogue Waves

This project concerns research into the oceanic phenomenon of the rogue wave to identify a grand unifying equation or field of equations that can accurately model rogue waves’ behavior under the certain conditions that create them.

Researching the eight primary theorized explanations of them with a cross-analysis of where current work has gone revealed a focus in the Nonlinear Schrödinger equation, or NLSE for short, in modeling and describing potential formation causes. In the conclusion of the literature review, an NLSE basis of equation synthesis was deemed appropriate alongside identifying several main factors in a type of rogue wave creation weather, deep water current, shallow water seabed.

Moreover, a grand unifying equation was determined too grand an undertaking. Expanded observation of the literature shows that rogue waves are not a single phenomenon but a family of waves with each not confined to direct causal factors, but a combination of numerous factors known and unknown that, when aligned, forms a rogue wave of a particular type. An equation that accurately models a rogue wave’s behavior under certain conditions was derived and is utilized to demonstrate the crux of the rogue wave dilemma.

ORAL RESEARCH PRESENTATION

Daniel O'Keefe '21

Major: Gender Studies
Minor: Sociology & Psychology

Thesis Adviser
Steven Schmidt, Associate Professor of Psychology

Adviser
Julie Raulli, Professor of Sociology

The Socialization of Attraction: Connections Between One's Sociocultural Environment and the Development of One's Sexual/Romantic Self

From bacteria to plant and animal life, we are, ostensibly, genetically inclined to strive for survival. Yet, the way in which we attempt survival is contingent on what our environment asks of us (evolutionary theory). It was once for food, reproduction, and security. In contemporary culture, being socialized as humans now are, reflecting and conforming to greater sociological attitudes, behaviors, and norms increases one's chances of survival.

The prejudice, which we often mask as preference, is symptomatic of mainstream ideologies and unspoken rules that dictate our social and physical existences. We are products of our environment because of evolutionary biology. We are predisposed to adapt to prejudicial attitudes and even behaviors as a means to live and prospectively mate/reproduce.

Our biology plays the role of motivations, but the socialization of attraction is relevant, to say the least, and cohesive in the argument of nature's role in development.

ORAL RESEARCH/POSTER PRESENTATION

Kelly Cormier '21

Major: Equine Facilitated Therapy & Psychology

Activities: EFT Club Treasurer, Psychology Club Vice President and Treasurer, Eventing Club, Mounted Drill Team, EFT Volunteer

Thesis Adviser

Keri Kytola, Assistant Professor of Psychology

Advisers

Ann O'Shallie, Professor of Equine Studies
Steven Schmidt, Associate Professor of Psychology
Amanda McMenamin, Associate Professor of Spanish

The Effect of Unmounted and Mounted Equine Activities on Self-Esteem and Self-Efficacy

Previous research has seen many benefits resulting from equine-related activities, including improvements to self-esteem and self-efficacy, but few studies focus on the potential benefits of groundwork alone (Baldwin, Rector, & Alden, 2018; Whittlesey-Jerome, 2014). Knowing the effects of these types of activities could be useful for improving equine programs.

The purpose of this study was to examine the effects that regular groundwork with a horse had on one's self-esteem and self-efficacy compared to mounted equine activities. Thirty-eight people were recruited to participate in this study. All participants were asked to complete an additional two sessions a week for eight weeks. The extra sessions consisted of either ridden or ground work with the participant's own horse. They also completed the10-item Rosenberg Self-Esteem Scale (Rosenberg, 1965) and the 8-item General Self Efficacy Scale (Chen, Gully, & Eden, 2001) before and after the eight weeks.

It was hypothesized that completing regular groundwork above and beyond one's typical routine would lead to an increase in self-esteem and self-efficacy similar to mounted equine activities. Independent t-tests will first be conducted to examine potential differences in pre and post-scores on the self-esteem and self-efficacy scales. Independent t-tests will then be conducted in order to see if there are any significant differences in self-esteem or self-efficacy between the two groups. Results will then be presented and discussed.

ORAL RESEARCH PRESENTATION

Jessica Rice '21

Major: Psychology
Minor: Animal Studies
Activities: Psychology Club, Orchesis, WCGA
Thesis Adviser Steven Schmidt, Associate Professor of Psychology
Advisers Ann O'Shallie, Professor of Equine Studies
Steven Schmidt, Associate Professor of Psychology
Keri Kytola, Assistant Professor of Psychology
Amanda McMenamin, Associate Professor of Spanish

The Effects of a Pandemic on the Mood of a Campus of a Small Liberal Arts College

This pandemic has been hard on everyone. Whether it be the loss of a job or the disruption of learning, unlike anything anyone has ever seen, college students are not spared from the effects of the pandemic.

In this experiment, the student researcher will endeavor to discover how the attitudes of Wilson College students toward the college and campus have been impacted. Students were recruited via their email and instructed to complete the survey, which was comprised of questions from the Campus Climate Survey. This round of data collection served as the pre-test. A total of 159 participants completed the survey during the pre-test. The Campus Climate Survey has been a way to judge students' attitudes towards campus throughout the year.

After collecting the initial responses, the student researcher and principal investigator determined that there was a decrease in the level of happiness to be at Wilson College when compared with previous years' data. After a month of planned intervention in the form of games set out in Lenfest Commons that would hopefully improve students' happiness being at Wilson College, the students were contacted again to complete the same survey, which served as the post-test.

Analyses will be run to determine if levels of happiness that were obtained during the pandemic have changed following the implementation of the intervention and if attitudes toward Wilson College collected during the pandemic differ from previous years.

POSTER RESEARCH PRESENTATION

Brandi Cook '24

A Comparison of Bacteria Occurrence in Raw Meat-Based Diets vs. Kibble Pet Food

Adviser
Deborah Austin, Professor of Chemistry

Feeding a raw meat-based diet (RMBD) has become very popular amongst pet owners. There is debate whether animals should be fed a RMBD or kibble. Pet owners should be aware of the potential bacteria found in commercial foods, whether it be a RMBD or kibble. Although there are a variety of potential bacteria, this research will focus on Salmonella enterica and Escherichia coli because they are bacteria commonly associated with health issues. The research will compare the number of bacteria in commercial kibble and RMBD from several manufacturers. The foods will be plated on media selective for each bacterium and incubated. The number of colonies of each bacterium will be determined. Based on the results of this research, pet owners will be able to make better-informed decisions about the food they feed their pets.

POSTER RESEARCH PRESENTATION

Elijah Klopp '22

Developing a Risk-Assessment Method for Reintroduced Scimitar-Horned Oryx using Camera Collars

Advisers
M. Dana Harriger1, Abigail Maley1, and Katherine Mertes2
1 Division Integrated Sciences, Wilson College and 2 Conservation Ecology Center, Smithsonian Conservation Biology Institute

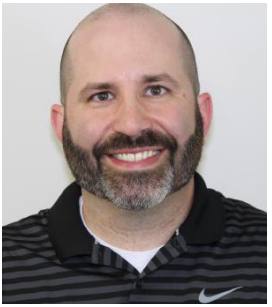
The scimitar-horned oryx (Oryx dammah) was declared extinct in the wild in the year 2000 (IUCN, 2020). Two groups of scimitar-horned oryx were reintroduced to their homeland in a protected area in Chad, Africa; one group of twenty-one individuals was released in March 2016, and another group of fourteen was released into the same reserve in January 2017. Competition for shade and resources, and the potential spread of disease are two of the main threats facing reintroduced populations of scimitar-horned oryx. The goal of this project is to determine a method to monitor these threats in a reintroduced environment so researchers can analyze threats to reintroduced species over time. Three oryx housed in Fossil Rim Wildlife Center in Glen Rose, Texas were fitted with camera collars around their necks that take videos periodically, thus enabling the numbers and species of animals around these focal individuals to be monitored. To further assess the accuracy of the data collected from these camera collars, an occupancy model will be created. An occupancy model helps to determine how close an observation is to detecting all of the species in an area by quantifying detection probability for the tool used for observation. This occupancy model will use the maximum individuals seen from each species throughout all the camera collar videos compared to the estimates of species in the reserve. Results of this study will demonstrate, based on these three focal individuals, how close the collars were to detecting all of the animals in the reserve.

POSTER RESEARCH PRESENTATION

Jacob Slifka '22

Quantifying the Inhibitory Effect of Valencia Orange Oil and Cinnamon Bark Oil on the Fungal Pathogen Pseudogymnoascus destructans in Hibernaculum Soil

Adviser
Deborah Austin, Professor of Chemistry



White nose syndrome (WNS) is a disease in bats caused by the fungus Pseudogymnoascus destructans. The fungus covers the bodies of the bats and causes physiological breakdowns that rouse them from hibernation, affecting their thermoregulation and water balance. This disruption can deplete winter fat stores and cause them to die from starvation or hypothermia. Since the fungus was discovered in North American in 2006, some bat populations have decreased by over 90%. With bats making up a multibillion-dollar contribution in pest control to agricultural production, the decimation of the bat population has the potential to have a significant impact. Though initially hypothesized that WNS only spread from bat to bat, research shows transmission can occur from the hibernaculum environment where the fungus grows in the soil. Previous research demonstrates some volatile organic compounds (VOCs), including compound VOCs such as essential oils, inhibit P. destructans growth in laboratory settings. However, the efficacies of VOCs are media-dependent, and their efficacy in hibernaculum soil is unknown. Valencia orange oil and cinnamon bark oil are two compound VOCs that show inhibiting effects to P. destructans but have not been tested for their efficacy in soil. Trials will be conducted in three treatments. The first treatment will test each oil in a bioassay containing the fungus to confirm their inhibiting effect. The second and third treatments will test each oil in a bioassay containing the fungus grown in sterilized hibernaculum soil or untreated hibernaculum soil, respectively, to discern if any changes in efficacy occur. Results of these treatments will be compared to control bioassays containing their respective media without the addition of any essential oils. This research hopes to show the effect the oils have on P. destructans within hibernaculum soil in hopes to develop future conservation strategies for bats.

POSTER RESEARCH PRESENTATION

Shaylene Vargas ’21

The Effects of Radiosensitizers Zataria multiflora Extract and Lumefantrine on Human Glioblastoma Cells

Adviser
Deborah Austin, Professor of Chemistry

Glioblastoma (GB) is the most common and aggressive malignant brain tumor with a 15-month median patient survival time. There is no current cure for GB. Although radiotherapy and temozolomide (TMZ) treatment are often prescribed as life-prolonging therapies, glioma cells are known to show significant resistance to both radiation and chemotherapy. The Friend leukemia integration 1 (Fli-1) protein, a transcription factor of the HSPB1 gene, plays a role in the development of radiation and TMZ resistance in GB. Lumefantrine is an antimalarial drug that has been found to inhibit Fli-1 and reverse the radiation/TMZ resistance in GB. A natural product (extract) from the Zataria multiflora plant has been shown to have radio sensitization effects on GB cells. The proposed research will study the effects of Zataria multiflora extract and lumefantrine in combination on the radiation and TMZ resistance of glioblastoma cells. One group of GB cells will be injected with Zataria multiflora extract, one group will be injected with lumefantrine, one group with both therapeutics, and one group will be the control group. The cells will be treated with radiation and TMZ, and cell viability, proliferation, and cytotoxicity will be quantified with an MTT assay. Apoptosis will be assessed by a caspase-3 assay. It is hypothesized that the group of GB cells treated with both Zataria multiflora extract and lumefantrine will be more sensitive to radiation and TMZ and will be killed in greater numbers than the other treatment groups. The combination treatment may result in a synergistic effect that improves the efficacy of GB treatment and reduces the toxicity of regular cells.

POSTER RESEARCH PRESENTATION

Jacob Whittington '23

Outcomes of Physical Therapy on Patients with Shoulder Injuries in Different Age Groups

Advisers
M. Dana Harriger1 and Tonia Hess-Kling2
1 Division of Integrated Sciences and 2 Division of Nursing and Health Sciences

The shoulder is one of the most commonly injured joints in the human body. In 2006, the American Academy of Orthopaedic Surgeons (AAOS) reported that roughly 7.5 million Americans received medical care for shoulder issues. Since 2012, more recent studies indicate increasing incidence of patients with shoulder complaints of up to 29.3 per 1000 individuals. Fractures, dislocations, frozen shoulder, and rotator cuff tears are a few common shoulder injuries that occur due to its unique anatomical design. Physical therapy targets and works to improve the healing process as well as improve function of an injured joint by increasing mobility, decreasing pain, and re-establishing function. Due to the commonality of shoulder injuries, it is vital to analyze the effects that physical therapy has on patients with shoulder injuries. This study will investigate whether a younger population of patients responds better to physical therapy by developing more mobility and strength, and a decrease in pain in the shoulder joint after a shoulder injury in comparison to an older population of patients. This study will involve data collection from former physical therapy patients, particularly those of whom were treated for a specific shoulder injury, and using that data to analyze and interpret the different conclusions that are found in terms of comparisons by age group. Specific data that will be analyzed includes but is not limited to mobility, strength, amount of pain, and time to discharge. Certain variables that will have to be taken into consideration are BMI, activity levels of patients, types of physical therapy being used, whether patients are performing exercises at home, and if glenohumeral joint range of motion is being measured or if glenohumeral joint along with shoulder girdle range of motion is being measured. Patient confidentiality will be maintained in accordance with IRB and HIPPA regulations.

POSTER RESEARCH PRESENTATION

Calista Wolfe ’22

The Effects of a Raw Based Diet on the Reduction of Dental Calculus in Dogs

Advisers
M. Dana Harriger, Professor of Biology
Adam Cooke, Lecturer/Research Advisor

Periodontal disease (PD) is one of the most prevalent oral diseases found in dogs. PD is an inflammatory disease that results from infection of the gums, bone, and tissues surrounding and supporting the teeth. PD develops from excessive buildup of dental calculus. Dental calculus is the hardening of dental plaque, saliva, bacteria, and minerals, and is directly linked to gingivitis. There are two stages of gum disease, gingivitis and periodontitis; without treatment gingivitis will progress to periodontal disease. The high percentage of dogs affected by periodontal disease renders it necessary to determine whether or not a dog’s diet has an impact on the reduction of dental calculus buildup. This study will contain two groups of dogs that will be fed different diets. One test group will be fed a commonly used kibble diet, which will be the same kibble diet the test subjects already consume. The other test group will be fed a commercially available raw based diet that is approved by the Institutional Animal Care and Use Committee. The amount of dental calculus buildup on the teeth of these dogs will be measured using an integration surface tool from imaging software and recorded every other day for three weeks. This study will help determine the effects of consuming a raw based diet versus a dry kibble diet in regard to how effective they are at reducing already established dental calculus buildup in dogs.

POSTER RESEARCH PRESENTATION

Shealyn Holzinger '22

The Potential Use of Aurone as a Novel Antifungal Agent

Adviser
Deborah Austin, Professor of Chemistry

Topical fungal infections are one of the most prevalent diseases in society today. In recent years, in the U.S. alone there were nearly 9 million cases of fungal diseases, and these numbers likely are underestimates because of the high rate of underdiagnosis. They are also one of the harder common-aliments to treat, as most antifungal chemicals are not fungicidal, instead they are fungistatic, meaning they simply inhibit growth. If antifungals can kill the fungus, they are often also hazardous to human cells as well. As a result, research into alternative antifungal chemicals is imperative. The purpose of this experiment and research is to determine if aurone (a heterocyclic flavonoid) has any antifungal properties. Aurone has been shown to act as a hormone inhibitor; most other types of antifungals (azoles, polyenes, and echinocandins) work by interfering with the sterol ergosterol, which is a crucial component in cell membranes. Aurone will be tested against Trichophyton rubrum (the fungi responsible for Tinea pedis and Tinea corporis, athlete's foot, and ringworm, respectively) in a MIC (minimum inhibitory concentration) assay in order to determine what concentrations of aurone will have fungistatic effects. Clotrimazole (a common, more traditional antifungal chemical) will be used as a control. Also, an MFC (minimum fungicidal concentration) test will be done to determine if aurone possesses any fungicidal abilities as well. After testing with MIC and MFC assays, it will be possible to determine if aurone possesses antifungal properties and how those properties compare to a traditional antifungal.

POSTER RESEARCH PRESENTATION

Joshua Howells '22

Effects of Post-Treatment Lyme Disease Syndrome and Potential Causes

Adviser
Deborah Austin, Professor of Chemistry

Lyme disease is caused by the bite of either Ixodes scapularis or Ixodes pacificus. Their bite infects the host with the bacterium Borrelia burgdorferi. Individuals infected by B. burgdorferi experience symptoms of fatigue, musculoskeletal pain, a target-shaped rash at the site of the bite, and in severe cases migraines. Every year Lyme disease affects 476,000 people nationwide, and 10-15% of them will develop Post-Treatment Lyme Disease Syndrome, or PTLDS. PTLDS is defined as prolonged symptoms for at least six months following the initial antibiotic treatment for Lyme disease. Many individuals will spend their entire lives fighting joint pain, fatigue, and neurocognitive problems. PTLDS currently affects over 2,000,000 individuals. No specific PTLDS biomarker has been found, making diagnosis and the specific causes difficult to determine. The proposed research will attempt to find correlation between age of onset, antibiotics given, certain symptoms of initial Lyme disease, and time between infection and treatment of Lyme disease with the diagnosis of PTLDS. Surveys will be administered to patients diagnosed with PTLDS asking questions concerning health background, symptoms experienced both during the initial Lyme and with PTLDS, and any antibiotics given during treatment for Lyme disease or PTLDS. These surveys will be compared to those administered to the control group who developed Lyme disease but did not experience any symptoms post-treatment. The data will be compiled and compared using statistical analysis to determine the correlation between the parameters studied and the onset of PTLDS.

POSTER RESEARCH PRESENTATION

Blanca Villeda '22

A Comparative Study of Primary Land Use and Microplastic Concentrations in Sediment

Adviser
Deborah Austin, Professor of Chemistry

Plastic is known for its durability and many applications. However, poor plastic waste management has resulted in copious amounts entering our environment. Microplastics are plastic debris less than 0.5 mm. They enter the environment directly (primary) or by the breakdown of bigger pieces (secondary). Once in the environment, microplastics have the potential to bioaccumulate, or gradually accumulate in organisms. Microplastics could also act as vectors or potential substrates for heavy metals and other pathogens. They are ubiquitous and have even been found in the Arctic. There has been extensive research of plastics on the marine ecosystem; however, there are limited studies on microplastics in running water of freshwater ecosystems. This study aims to analyze microplastic concentrations along the Conococheague Creek. The Conococheague Creek is a tributary of the Potomac River and has been designated as a recreational trout water and public water supply. This study will analyze microplastic concentrations regarding land usage along the creek. Land usage will be categorized by primary use of surrounding land. Creek sediment samples will be collected from three different land usage sites: primarily agriculture, primarily urban, and a pristine water site. The samples will be preprocessed to separate microplastics from organic material. Microplastics will then be identified and quantified using nile red staining followed by microscopy. The results will allow us to determine if microplastic concentrations in the creek vary along with land use. This could help us identify which kind of land use provides the most input of microplastic into freshwater ecosystems.

POSTER RESEARCH PRESENTATION

Patrick Beaston ’21

The RMS Titanic: Profound Impact on Lifeboat and Safety Regulations

Adviser
Bonnie Rock-McCutcheon, Lecturer of Classics

The sinking of the RMS Titanic has been one of the most notable fatal ship sinking’s, with the loss of life of over 1,500 people, and with approximately 700 survivors. The sinking of the RMS Titanic is regarded as one of the worst ship sinking’s in all of maritime history. The story of the RMS Titanic is popular among the general public as the ship that sank after it collided with an iceberg in the North Atlantic Ocean and with an inadequate number of lifeboats. The RMS Titanic altered the safety regulations onboard future ocean liners and ships. One of these regulations that altered the course of ocean liner and ship safety were the lifeboats. During the time of the RMS Titanic, regulations required large ocean liners such as the RMS Titanic, to carry at least 16 lifeboats, or enough for only 1,040 persons, given each of the 16 lifeboats carried a maximum capacity of 65 persons. Despite the RMS Titanic possessing the capability of carrying up to 64 lifeboats, her boat deck was only fitted with 20 lifeboats, or for a total of 1,178 people After the sinking and disaster, the regulations required all ocean liners and ships to carry enough lifeboats for every passenger and crew member. The conduct and protocols of the lifeboats and drills were also profoundly impacted after the RMS Titanic’s sinking. The HMHS Britannic, which was utilized as a traveling hospital ship during World War I and transported soldiers and medical personnel to and from the Mediterranean, served as proof of how the altered regulations of the lifeboat and safety protocols changed and resulted in a significant decrease in the loss of life.

POSTER RESEARCH PRESENTATION

ESS 340: Applied Anatomy and Kinesiology

Field Hockey Penalty Stroke
Soccer Penalty Shot
Baseball Pitch (Fastball)
Softball Pitch (Fastball)
Volleyball Spike
Basketball 3-Point Shot

Adviser
Tonia Hess-Kling, Assistant Professor of Exercise and Sports Science

Students in ESS340 – Applied Anatomy and Kinesiology round out their one-semester course studying advanced anatomy principles and foundations of kinesiology with a culminating group project. This project is aimed at creating an active and student-centered learning environment; while also encouraging them to take a more vested and applied approach to what they are learning. The reason for this is simple; it is important that students understand how the human body functions and moves in order to prevent injury or harm, especially as future fitness and healthcare professionals. The overall goal of this project is to encourage and enhance a deeper understanding of what happens when the body is put through a sport skill. During their experience, groups conduct research and biomechanical analysis on their assigned sport skill. Their project focuses on a myriad of factors related to their sport skill, including, but not limited to, movement phases, muscle agonist/antagonists, joint ranges of motion, as well as planes of motion, biomechanical principles, and proper technique(s). Groups create professional posters to reflect knowledge gained through their experience, as well as serve as a platform to convey pertinent facts and concepts to the community; therefore, helping to raise general awareness.

Group Poster Topic and Group Members

Field Hockey Penalty Stroke
- Morgan Burkepile
- Dereck Ivey
- Eduardo Rosado

Soccer Penalty Shot
- Jose Carmona-Nunez* (ADP)
- Joshua Harvey

Baseball Pitch (Fastball)
- Brandon Cook
- Jacob Whittington

Softball Pitch (Fastball)
- Ethan Phillips
- Katelyn Roth

Volleyball Spike
- Kevin Finn
- Tia Jones

Basketball 3-Point Shot
- Joseph Cofer
- Christian Evans

POSTER RESEARCH PRESENTATION

HSC 216: Human Anatomy and Physiology II

Pulmonary Embolism
Muscular Atrophy
Parkinson's Disease
Arthritis
Crohn's Disease
Chronic Obstructive Pulmonary Disease

Adviser
Tonia Hess-Kling, Assistant Professor of Exercise and Sports Science

Students in HSC216 – Human Anatomy and Physiology II round out their two-semester course studying human anatomy and physiology with a culminating group research project. This project is aimed at creating an active and student-centered learning environment; while also educating students on the basic fundamentals of conducting research in the field. The reason for this is simple; it is important that students understand how our bodies work so that we are able to take care of them, especially as future healthcare professionals. The overall goal of this project is to encourage and enhance a deeper understanding of what happens when the body is not functioning how it is supposed to; and what those consequences are. During their experience, groups conduct research on a chronic condition of their choosing. Their research focuses on a myriad of factors related to their chosen chronic disease, including, but not limited to, causation, cellular, anatomical and/or physiological adaptations, as well as current diagnostic and therapeutic methods. Groups create professional research posters to reflect knowledge gained through their experience, as well as serve as a platform to convey pertinent facts and concepts to the community; therefore, helping to raise general awareness.

Group Poster Topic and Group Members

Pulmonary Embolism
- Efelomo Vanessa George
- Lauren Moss
- Haley Privett
- Kassie Reeves

Muscular Atrophy
- Colby Maun
- Julia Mohler
- Megan Simms
- Julia Woerner
- Samuel Worthen

Parkinson's Disease
- Hailey Chaney
- Michael Jeffries
- Aura Langley
- Katherine Romero

Arthritis
- Naomi Butterfield
- Brandon Cook
- Christian Evans
- Terrell Samuels

Crohn's Disease
- Morgan Burkepile
- Kylee Hoffman
- Rachel Rodriguez
- Brittany Washburn

Chronic Obstructive Pulmonary Disease
- Drew Alldredge
- Tyler Brown
- Raina Sylvestre
- Brittin Whistler

POSTER RESEARCH PRESENTATION

NUR 404: Human Anatomy and Physiology II

Preventing Skin Infections in Total Knee Arthroplasty

Adviser
Melinda Guinard, Assistant Professor of Nursing

Total knee arthroplasty surgeries have an incidence of 1-2.5 percent of developing a post-surgical infection (Mistry et al., 2017). As a result of these surgical infections, it leads to longer hospitalization, more surgical procedures, and higher overall costs. During a study, it was found that revision procedures went to $560 million from $320 million and were estimated to be $1.62 billion by 2020 (Mistry et al., 2017). Preventing total knee arthroplasty infections is significant in reducing the prevalence of risk and their associated costs. Therefore, the research question that arises is: In total knee arthroplasty surgical patients, is chlorhexidine more effective than soap in decreasing postoperative infections?

Interventions put in place to prevent total knee arthroplasty infections are surgical technique, sterile protocol, and operative procedures. The usage of chlorhexidine products has shown evidence of lowering the incidences of post-surgical infections (Mistry et al., 2017). Chlorhexidine products have shown a significantly lower post-surgical infection rate compared to non-medicated soaps and cloths (Mistry et al.,2017). Preoperative chlorhexidine skin preparation appears to decrease the risk of skin infection leading to less revision surgery, and a reduction in the length of hospitalization in patients undergoing total knee arthroplasty.

Group Poster Topic and Group Members

Preventing Skin Infections in Total Knee Arthroplasty

Justina Peffer
Kara Collingsworth
Chloe Sprecher
Gayle Alleman

POSTER RESEARCH PRESENTATION

NUR 404: Human Anatomy and Physiology II

Using Antimicrobial Properties Versus Cotton and Gauze Dressing for Wound Dressings

Adviser
Melinda Guinard, Assistant Professor of Nursing

When a patient has a wound there are multiple interventions that need to be in place, with one being dressings over the wound site to help prevent the formation of infection. There are multiple different options that can be used to dress a wound site. Some of which include the use of antimicrobial properties as well as the use of cotton and gauze.

Studies have been conducted to determine that these forms of dressings are safe and effective in dressing wounds. The question to be investigated is, are dressings with antimicrobial properties more effective than current cotton and gauze dressings at reducing wound infections? This poster has been created to determine which form of dressings is the best choice in trying to reduce the occurrence of wound site infections.

Group Poster Topic and Group Members

Using Antimicrobial Properties Versus Cotton and Gauze Dressing for Wound Dressings

Kendra Foltz
Kayla (McFerren) Peck* (ADP)
Jenna Robinson* (ADP)
Elissa Deshong

POSTER RESEARCH PRESENTATION

NUR 404: Human Anatomy and Physiology II

Car Seat Testing

Adviser
Melinda Guinard, Assistant Professor of Nursing

Infant car seats are essential for the safe automobile transportation of neonates and young children. Car seat testing is necessary for premature infants and other newborns with conditions that don't allow them to tolerate riding in normal car seats. The answered PICO question is, "In preterm infants, does a car seat tolerance test before leaving the hospital decrease the instance of mortalities post discharge when compared to no car seat tolerance test before leaving the hospital?" Premature infants are at risk for cardiorespiratory instability due to potential cardiopulmonary malformation when placed into the thirty-to-forty-five-degree angle of the car seat.

Based on literature reviewed, size as well as gestational age and development upon birth are extremely important in the implementation of a car seat tolerance test before discharge. Research has provided evidence as to why premature babies who are deemed ready for discharge and did not receive a car seat tolerance test are at risk for hypoxia and bradycardia while positioned in the car seat. The parameters and description of the test are described in detail, as well as what may be done if the infant were to fail a car seat tolerance test. Research about why the test is important for premature infants and how it helps to prevent infant mortality is expanded upon and visual aids are included to allow for the viewer to better understand what the differences between the car seats are.

Group Poster Topic and Group Members

Car Seat Testing

Siara Gossert
Cheyenne Colon
Jordan McCoy

POSTER RESEARCH PRESENTATION

NUR 404: Human Anatomy and Physiology II

For Patients in Cardiac Arrest, How Effective is It When Patients' Families are Present During Resuscitation Versus When They are Sent Out of the Patient's Room?

Adviser
Melinda Guinard, Assistant Professor of Nursing

Family members are an important part of patient care. They can be valuable in assisting with positive client outcomes. In regards to cardiac resuscitation, a consensus has not been reached on whether or not family presence will help or hinder this process. In this paper, we will analyze recent literature from CINAHL. Articles needed to be written in the last five years to be included.

Most of the articles were descriptive qualitative studies because this intervention explores the feelings of the participants. It was found that most of the patients and family members preferred to be together during such an event with the exception of those who may intervene in care or who may experience increased stress by witnessing the event.

There are conflicting reports from healthcare providers on the matter. Some believe that having family members present enhances client care and comfort. Others believe that it decreases quality of care related to performance anxiety and family interference. More research should be done on whether or not family presence is beneficial to clients and their families during cardiac resuscitation.

Group Poster Topic and Group Members

For Patients in Cardiac Arrest, How Effective Is It When Patients´ Families Are Present During Resuscitation Versus When They Are Sent Out of the Patient's Room?

Heidi Shriner* (ADP)
Elizabeth Destacamento
Alyssa Monn
Autumn (Langley) Hurley

POSTER RESEARCH PRESENTATION

NUR 404: Human Anatomy and Physiology II

Medical Marijuana and Chronic Pain

Adviser
Melinda Guinard, Assistant Professor of Nursing

Studies on medical marijuana are growing as patients are seeking more holistic ways to manage their medical problems. Some of the medical problems that qualify individuals for a medical marijuana card are cancer, anxiety, Parkinson's disease, and epilepsy. These four disease processes are commonly treated with multiple medications, and those medications can come with many undesirable side effects.

In Pennsylvania, there are four steps that need to be completed in order to obtain a medical marijuana card, one being a physician certifying that the patient qualifies for the card under the government guidelines. The most common use of medical marijuana is for chronic pain relief. Studies are finding that cannabis works on the CB receptors to produce an analgesic effect. The minimal side effects are much more desirable to patients with chronic pain than the typical pharmaceuticals prescribed.

Research for this paper was completed to discuss the findings for medical marijuana being a better alternative to typical pain medications, such as opioids, in the treatment of chronic pain. Through the research, it has been found that the use of medical marijuana has led to a decrease in opioid use.

Group Poster Topic and Group Members

Medical Marijuana and Chronic Pain

Alyssa Keefer
Melissa Bradley
Tosha Harbaugh
Anastasia Case

POSTER RESEARCH PRESENTATION

NUR 404: Human Anatomy and Physiology II

The Benefits of Pet Therapy

Adviser
Melinda Guinard, Assistant Professor of Nursing

Pet therapy is a growing field that uses animals to help patients recover from or better cope with health problems. Acute care facilities arrange for therapy animals to make scheduled visits to alleviate pain, distress, improve emotional well-being, and motivate patients, visitors and staff.

There has been a positive correlation between the use of pet therapy and decreased patient anxiety and increased patient comfort levels. Studies have shown that pet therapy also improves morale among families of patients and staff members. Pet therapy provides positive reinforcement for healing and also reminds the patients to motivate themselves of the need to return home.

Group Poster Topic and Group Members

The Benefits of Pet Therapy

Sierra Gress
Evelyn Ziemkiewicz
Allison Schulz
Caitlin Hunsecker

POSTER RESEARCH PRESENTATION

NUR 404: Human Anatomy and Physiology II

Use of Patient Safety Precautions and Patient Falls

Adviser
Melinda Guinard, Assistant Professor of Nursing

A fall in the acute care medical setting causes a more difficult recovery period for an elderly patient. Falls within the older generation have increased over the last three decades and are predicted to continue in an upward trend (King et al., 2016). Interventions are needed now to stop this trend.

There are many different fall precautions used with admitted patients, but which ones would decrease the greatest number of falls is unknown. Therefore, the question posed: In the elderly high-risk fall patient, how does a one-on-one sitter verse the use of bed alarms with fall precautions affect the rate of reducing falls/death during hospitalization? Nurses never want to see a patient hurt while under their care and are constantly receiving patient prevention education to implement with the admitted patient.

Through a literature search, the goal was to demine which type of fall prevention is superior in keeping patients safe and can be implemented easily.

Group Poster Topic and Group Members

Use of Patient Safety Precautions and Patient Falls

Morgan Jacoby
Brittney Aubin
Alisha Shank
Rae Stup

POSTER RESEARCH PRESENTATION

NUR 404: Human Anatomy and Physiology II

Mental Health Benefits of Animal Therapy

Adviser
Melinda Guinard, Assistant Professor of Nursing

In recent years, animal therapy, or human-animal interaction (HAI), has begun to gain recognition for its various benefits in mental health. For this reason, HAI programs have started to become more prominent in healthcare settings. Yet, additional involvement in more long-term care facilities could prove highly beneficial in clients' mental outcomes.

Animal therapy has a wealth of benefits that enable increased mental health in clients. Implementing HAI programs into more clinical settings, such as long-term care facilities, can generate very positive results for clients who would otherwise suffer from poor outcomes.

By looking at the extensive benefits of animal therapy, it is evident that increased implementation of HAI programs is necessary.

Group Poster Topic and Group Members

Mental Health Benefits of Animal Therapy

Chelsea (Scofield) Hockenberry
Sara Ball
Katelyn Brown
Aaron Welper
Alyssa Bingaman

POSTER RESEARCH PRESENTATION

BIO 207: Vertebrate Physiology

Adviser
Brad Engle, Associate Professor of Biology

Join the students enrolled in BIO 207: Vertebrate Physiology for an interactive forum and engage with them as you learn about various physiological parameters, responses, and adaptations in animals and humans. Posters will reflect a comprehensive presentation of knowledge that the students gathered as they researched specific physiological mechanisms of the vertebrate organism under varied conditions. This student-centered, active learning experience incorporates the scientific poster presentation to develop a better understanding of physiological principles and facilitate communication about their chosen topic. Students successfully reviewed the primary literature to collect information about physiological effects, as well as underlying physiological mechanisms and responses to changing environmental conditions, both short and long-term. An overarching goal of the poster project was to substantially enhance the depth of understanding of physiology, as well as provide a forum for an educational opportunity to convey facts and concepts about physiological mechanisms to the broader community.

Group Poster Topic and Group Members

STUDENT	TOPIC
Alexis Alleman	*Echolocation in Bats*
Leah Barchock	*Femoral Pore Secretions and Pheromonal Communication in Lizards*
Hannah Clark	*The Evolution and Physiology of Male Pregnancy in Seahorses, Pipefishes, and Sea Dragons*
Taylor Hoverter	*Caribou Surviving in Harsh, Cold Climates: Adaptations to Ensure Survival*
Natalie Peak	*Whitetail Deer Antler Deformities Caused by Injuries: Underlying Physiological Mechanisms*
Rose Runyan	*Thermal Insulation of Blubber: How Blubber Helps Mammals in Cold Climates Regulate Body Temperature*
Calista Wolfe	*Degeneration of the Stria Vascularis in Pigment-Associated Hereditary Deafness in Dogs*

POSTER RESEARCH PRESENTATION

BIO 306: Immunology

Advisers
Brad Engle, Associate Professor of Biology
M. Dana Harriger, Professor of Biology

Join the students enrolled in Bio 306, Immunology, and engage with them as you learn about various types of immunological disorders. Posters will reflect a comprehensive presentation of knowledge that the students gathered as they researched specific disorders. This student-centered, active learning experience incorporates the scientific poster presentation to foster the learning of immunology as well as the communication of their chosen topic. Students successfully mined primary literature to collect information ranging from epidemiological data on incidence and population trends, any suspected correlations to genetics as well as inheritable factors to current and trending diagnostic and therapeutic approaches to the disorder. An overlying goal of the poster project was to substantially enhance the depth of understanding of the biology of immunology as well as provide a forum for an educational opportunity to convey facts and concepts about immunological disorders to the broader community.

Group Poster Topic and Group Members

STUDENT	TOPIC
Alexis Alleman	*Immune Response to Cancer Cells*
Brandi Cook	*Psoriasis and the Inflammatory Response*
Rebekah Dobard	*Immunotherapeutic Approaches to Breast Cancer*
Kelly Lepouski	*Immunology of Heart Valve Rejection*
Paige Reynolds	*Advances in Transplantation Immunology*
Alexis Sarver	*Role of Immunity in Psoriasis*
John Sollenberger	*Autoimmune Disorder: Systemic lupus erythematosus (SLE)*
JoAnna Stanford	*Immunity and Progress in Treatment of Rabies*
Elsa Tabaku	*Immunotherapy for Oral Cancer*
Shaylene Vargas	*Treatments of Cold Urticaria*
Ryder Wallace	*Effects of Lyme Disease*
Brittany Washburn	*Natural Therapy for Immune Disorders*
Madison Williard	*Tumor Rejection Antigen of Sarcoma*
Cheyenne Yoder	*Use of Helminths for Autoimmunity Disorders*

We would like to thank the members of the Student Research Day Committee. Without you, this wonderful day showcasing our students and their research would not be possible.

Thank you for all your hard work.

Megan Mizanty
Asst. Dir. MFA Program/Assistant Professor of Dance
Chair, Student Research Day Committee

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Instructor of Veterinary Nursing

Daniela DiGregorio
Assistant Professor of Education - TESOL

Katie Sarachan
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