

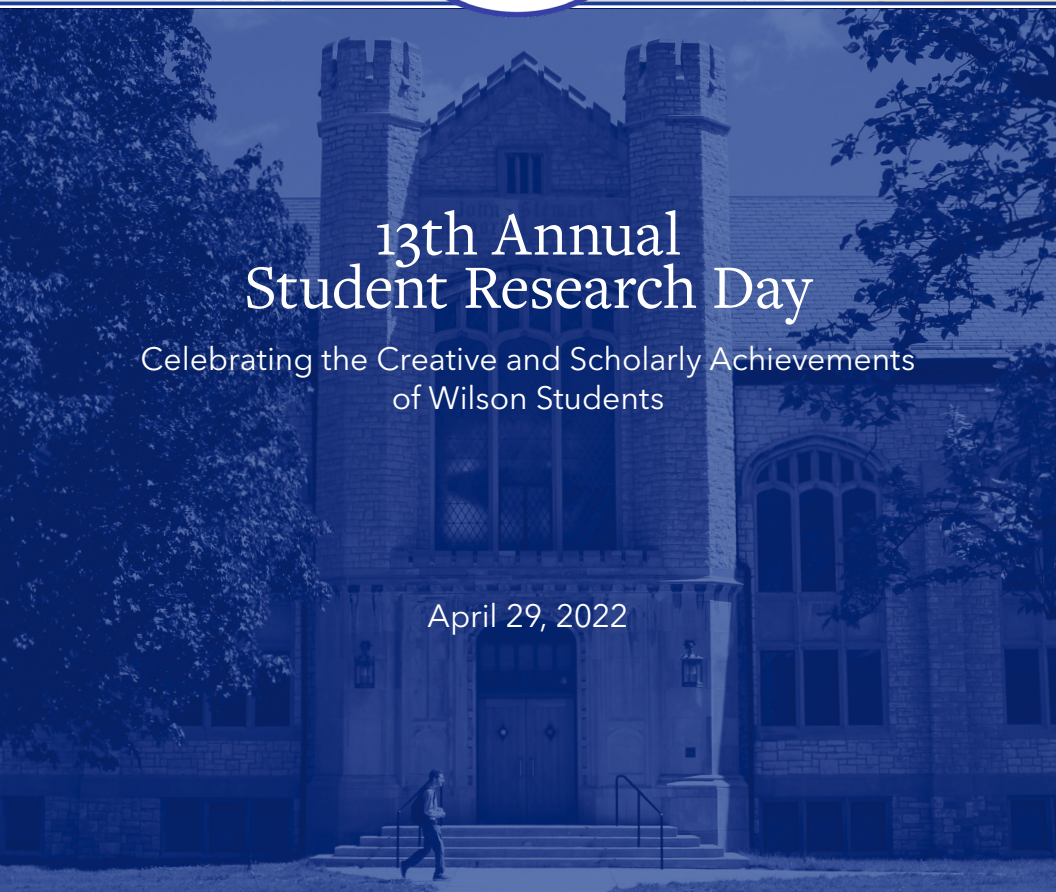
# WILSON COLLEGE



## 13th Annual Student Research Day

Celebrating the Creative and Scholarly Achievements  
of Wilson Students

April 29, 2022



# 13th Annual Student Research Day



Welcome to the thirteenth annual Wilson College Student Research Day. I arrived at Wilson College in 2014, and 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 — come 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, 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 60 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, Ph.D.

Vice President for Academic Affairs, Dean of the Faculty



# SCHEDULE OF EVENTS

## Library Learning Commons: Oral Presentations

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- 8:50–9 a.m. Welcome Address – **Wesley R. Fugate**, *president*
- 9–9:50 a.m. **Divine Hilliard '22** (p.2) *Single Mothers and Mental Health*
- Nathaniel Hoffman '22** (p.3) *How has COVID-19 had an Effect on Law Enforcement Officer Employment Satisfaction and Stress Levels*
- Michaela Funk '22** (p.4) *Academic Support Strategies: Comparing rate of use and school performance of students with an ADHD diagnosis and students without an ADHD diagnosis*
- 10–10:50 a.m. **Carter Marsh '22** (p.5) *Resting Heart Rate Assessment of the National Aquarium's Atlantic Bottlenose Dolphins*
- Madison Smarsh '22** (p.6) *Justice in Design*
- Sierra Hill '22** (p.7) *Transformational Leadership Theory in "How To Get Away With Murder"*
- 11–11:30 a.m. **Carter Marsh '22** (p.8) *Evaluating Temporal Variation in Giraffe Behaviour: Patterns within Activity Budgets*

# Brooks Science Center Auditorium: Oral Presentations

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- 9:20–9:30 a.m. Welcome Address – **Elissa Heil**, *vice president for academic affairs, dean of the faculty*
- 9:30–10:20 a.m. **Shealyn Holzinger '22** (p.9) *The effectiveness of sulfuretin as an antifungal chemical compound compared to clotrimazole on Trichophyton rubrum*
- Brandi Cook '22** (p.10) *An evaluation of Salmonella spp. and Escherichia coli in feline commercial raw meat-based diet and kibble*
- Kelsey Novak '22** (p.11) *Practices for Environmental Change at Wilson College*
- 10:25–10:45 a.m. **Joshua Howells '22: Honors** (p.12) *Effects of post-treatment Lyme disease syndrome and potential causes*
- 10:50–11:10 a.m. **Jacob Slifka '22: Honors** (p.13) *Quantifying the contact-independent inhibitory effect of cinnamon bark oil on the fungal pathogen Pseudogymnoascus destructans*
- 11:15–11:35 a.m. **Elijah Klopp '22: Honors** (p.14) *Use of camera collars to monitor reintroduction risks to Oryx dammah, scimitar-horned oryx*
- 11:40–12:00 p.m. **Calista Wolfe '22: Honors** (p.15) *The comparative effects of a raw based diet versus a kibble diet on the reduction of dental calculus in dogs*
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12:00–1:30 p.m. **Break**

- 1:30–1:50 p.m. **Jacob Whittington '22: Honors** (p.16) *Analysis of the outcomes of physical therapy on patients with shoulder injuries in different age groups*
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- 1:55–2:15 p.m. **Blanca Villeda '22: Honors** (p.17) *A comparative study of primary land use and microplastic concentrations of sediment in the Conococheague Creek*
- 2:20–2:40 p.m. **Shaylene Vargas '22: Honors** (p.18) *The combinatorial effects of lumefantrine and tetrandrine on the radiation sensitivity of U-87 glioblastoma cells*
- 2:45–3:10 p.m. **James Pasaribu '22: Honors** (p.19) *Effects of Sense of Belonging for International Students and their Academic Performance*
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## Disert Scholar

- 3:20–3:50 p.m. **Delaney Banzhof '22** (p.1) *College Students' Perspectives on the Efficacy of Telehealth Based Therapy Compared to In-Person Therapy*
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## Poster Session - 12:00 - 1:30 p.m.

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*Located in the front lobbies of both the Library and Brooks Science Center including posters from these classes as well as individual posters:*

*BIO 398 — Design and Methods of Scientific Research*

*CHM 398 — Design and Methods of Scientific Research*

*BIO 270 — Topics in Biology*

*HSC 216 — Human Anatomy and Physiology II*

*SOC 401 — Advanced Seminar*

*ACC 301 — Auditing/Assurance Services*

*ACC 307 — Cost Accounting*

*ACC 322 — Taxes II*



Delaney Elise Banzhof '22

**Major:** Psychology

**Minor/Certification:** Sociology minor

**Activities:** Psychology Club president, ODK member

**Faculty Adviser**

Steve Schmidt, Associate Professor of Psychology

*College Students' Perspectives on the Efficacy of Telehealth Based Therapy Compared to In-Person Therapy*

As the COVID-19 pandemic forced people to stay at home and avoid contact with others, there was a 154 percent increase in the use of telehealth services (Koonin et al., 2020). This increase in usage provided an opportunity to evaluate the perceived efficacy of telehealth services for mental health treatment, including for college students whose mental health was also impacted by the pandemic (Hamza et al., 2020; Son et al., 2020).

The present study aimed to examine the perceived efficacy of telemental health services by asking those who have experience in different forms of therapy to score their client satisfaction using the Client Satisfaction Questionnaire (CSQ-8; Clifford & Larsen, 1979) and asking all participants to rank forms of therapy by perceived efficacy. This study also examined the impact of the COVID-19 pandemic on mental health over the course of four time periods by asking students to rate their overall mental wellbeing on a scale of 1 to 10 at each time period.

Quantitative analysis found that CSQ-8 scores were 21% higher for in-person/previously in person but now remote therapy than telemental health services. Furthermore, solely in-person therapy was ranked first in efficacy on average followed by in-person but now remote and telemental health services respectively. Analysis also found that while overall, the recorded scores of mental wellbeing during the COVID-19 pandemic were not statistically significant across the four time periods, there was a significant increase in mental health between the third and fourth time periods ( $p=.003$ ).

These findings are useful in determining how college students perceive the efficacy of telemental health services and how the COVID-19 pandemic has affected their mental well-being.



## ORAL RESEARCH PRESENTATION



### Divine Justice Hilliard '22

**Major:** Psychology

**Minor/Certification:** Business

**Adviser**

Steve Schmidt, Associate Professor of Psychology

### *Single Mothers and Mental Health*

Mental health is a person's state regarding their psychological and emotional well-being. Previous research has shown that mothers in college are at risk of experiencing more stress than traditional students, which can trigger mental health problems. Single mothers are also more likely to experience stress which impacts their mental health negatively compared with mothers who are not single.

The purpose of this longitudinal research was to compare the mental health predictors in single and non-single mothers in college, specifically financial resources, social support, day-to-day stressors, and coping strategies. Unfortunately, no partnered mothers joined the study, so the data analysis looked at the impact of the predictor variables on the single mother's change in mental health.

The participating mother's mental health was analyzed for three weeks during the spring semester of 2022. A short online survey was sent via email to all participants regarding one's background information and current mental health. Following the surveys, they were asked to complete a 3-week online assessment log, once per week, to track their weekly stressors and resources. At the close of the study, the initial mental health survey was administered a second time.

Results showed that social support, coping, and self-care were positively related to changes in mental health. These findings and implications will be discussed.



## Nathaniel Hoffman '22

**Major:** Psychology

**Athletics:** Baseball

**Adviser**

Steve Schmidt, Associate Professor of Psychology

### *How has COVID-19 had an Effect on Law Enforcement Officer Employment Satisfaction and Stress Levels*

The Covid-19 pandemic has had an impact on various occupations. Law enforcement is one area where that impact may not be as obvious. This study analyzed how job satisfaction and stress levels of law enforcement officers have changed since the start of the pandemic.

This study reached out to over 20 different police captains across the central Pennsylvania area. Officers were asked to complete a survey that was designed to determine if their job satisfaction and their stress levels have changed since the start of the Covid-19 pandemic. The survey also included multiple areas of job satisfaction, such as interactions with their leadership teams and interactions within the community.

Survey responses were analyzed to determine the level of change in job satisfaction and stress levels. This information will help determine how the satisfaction and stress levels have been affected by the Covid-19 pandemic.





## ORAL RESEARCH PRESENTATION



**Michaela Funk '22**

**Major:** Psychology

**Adviser**

Alexandra Toms, Instructor of Psychology

*Academic Support Strategies: Comparing rate of use and school performance of students with an ADHD diagnosis and students without an ADHD diagnosis.*

Students who have been diagnosed with ADHD are struggling in the classroom more than students who do not have an ADHD diagnosis. Research suggests that students who have been diagnosed with ADHD have lower exam scores and lower school grades than students who do not have an ADHD diagnosis (Lanberg et al., 2011).

The present study aimed to examine how well Academic Support Strategies help students with an ADHD diagnosis succeed. Participants' data were categorized based on their diagnosis of ADHD. They were asked to take an Academic Support Survey and report their GPA.

Quantitative analyses showed no significant differences in GPA or use of academic support strategies based on ADHD diagnosis. After categorizing participants as either high or low use of Academic Support Strategies, analyses found no significant interaction between ADHD diagnosis and use of academic support strategies for GPA. Further research is needed to understand how Academic Support Strategies may impact individuals with an ADHD diagnosis.

Keywords: ADHD, Academic Support Strategies, GPA



## Carter Marsh '22

**Major:** Animal Studies

**Adviser**

Ann O'Shallie, Professor of Equine Studies

### *Evaluating Temporal Variation in Giraffe Behaviour: Patterns within Activity Budgets*

Giraffe (*Giraffa camelopardalis*) experience diverse environmental conditions that vary over time, and these factors can influence behavior. Murchison Falls National Park (MFNP), the largest national park in Uganda, contains >90% of giraffe in the country, with the largest known population of the critically endangered Nubian giraffe (*G.c. camelopardalis*) in the world.

Using full-day focal follow behavioral observations conducted at MFNP, I constructed activity budgets on Nubian giraffe to examine patterns of behavior across temporal gradients. I explored emergent behavioral patterns at different temporal scales and environmental conditions: seasonality, lunar luminosity, and time of day. Emphasis was on feeding behaviors (foraging and ruminating), as feeding is an ecologically significant behavior and the primary activity seen in giraffe, making it a strong indicator of shifts in activity.

I found no significant differences across seasons; however, giraffes foraged significantly less following bright nights ( $p = .039$ ). Additionally, I identified daily bimodal foraging patterns with an inverse relationship with laying behavior, an expected pattern reported in previous behavioral analyses of the species.

MFNP is currently experiencing a period of increased human development with road construction and petroleum extraction. Developing accurate baselines of activity budgets and understanding natural variations in behaviors can inform mitigation strategies for limiting the impact of development on this critical population.

Results from this study can inform subsequent work with spatial data to enhance the understanding of Nubian giraffe and investigate relationships between habitat selection and activity.



## ORAL RESEARCH PRESENTATION



### Madison Smarsh '22

**Major:** Graphic Design

**Minor/Certification:** Photography

**Adviser**

Philip Lindsey, Professor of Fine Arts

Madison will be presenting an exhibition of her capstone project in the Bogigian Gallery from April 27 - May 15, 2022

### *Justice in Design*

Type is a fundamental structure in graphic design and can create an emotional response from viewers or create a specific mood within a composition. Type, when used in an effective manner, may not need a photograph to carry a message or express an idea. By virtue of its nature, type has the power to convey messages directly or indirectly, in linear as well as non-linear terms.

This body of work explores social justice through graphic design employing images with type, as well as type alone to communicate specific ideas and themes. I want to use design and photography to address simple as well as complex compositional designs and concepts.

Explorations in my capstone experience are based on work done in intermediate and advanced graphic design course work. This project will explore the intersection of type and image and explore a range of possibility separating the two components.

## ORAL RESEARCH PRESENTATION



**Sierra Hill '22**

**Major:** Liberal Studies

**Minor:** Sociology, Communications, Applied Ethics

**Athletics:** Women's Volleyball

**Activities:** Fighting Phoenix, Orientation Leader

**Adviser**

Michael Cornelius, Professor of English

### *Transformational Leadership Theory in "How To Get Away With Murder"*

Annalise Keating (Viola Davis) is a very powerful person in the field of legal studies in the popular television series "How to Get Away With Murder."

At first, Annalise is depicted as willing to do whatever it took to win her case, but this behavior evolved throughout the series. Annalise is a strict type of leader, closely scrutinizing her intentions demonstrates that she only wants the best for everybody working for her, along with her clients.

Annalise's wise and hardworking style and adaptability are something a lot of leaders should show. Her way of leadership is related to Transformational Leadership because of how she connects with her proteges working under her.

Annalise builds a special connection with each of them to keep them motivated while also tending to their specific needs as an individual while also being a wise and strict leader. She makes sure her people are being ethical with the law and their emotional and educational decisions.



## ORAL RESEARCH PRESENTATION



**Carter Marsh '22**

**Major:** Animal Studies

**Adviser**

Ann O'Shallie, Professor of Equine Studies

### *Resting Heart Rate Assessment of the National Aquarium's Atlantic Bottlenose Dolphins*

The National Aquarium in Baltimore, Md. currently houses six Atlantic bottlenose dolphins (*Tursiops truncatus*). As a part of their husbandry, they undergo training sessions throughout the day, which can be utilized for a multitude of purposes. Exercise sessions are one of the types of training sessions dolphins participate in, where a heart rate check behavior is performed throughout to track both resting and active heart rates. This quantifies the effectiveness of the session at achieving exercise by measuring heart rate across the session.

This correlational study is to evaluate variability in resting heart rate in our Atlantic bottlenose dolphin colony, exploring differences across individuals. The Marine Mammal Department incorporated heart rate checks for all individuals at the start of sessions, regardless of session type. Resting heart rate was previously only recorded during exercise sessions.

At the time of writing, data collection is still in progress, but this research serves as a comprehensive overview of average resting heart ranges for our individuals, in addition to reducing the association of heart rate checks with exercise sessions.



## Shealyn Holzinger '22

**Major:** Biochemistry & Molecular Biology

### Advisers

Kathryn Sarachan, Assistant Professor of Chemistry

Adam Cooke, Instructor of Biology

*The effectiveness of sulfuretin as an antifungal chemical compound compared to clotrimazole on *Trichophyton rubrum**

Topical fungal infections are among the most prevalent and widespread diseases faced by humankind in today's world. Current treatments usually include either topical creams or ingestible pills, yet the former are often ineffective and the latter result in unwanted side effects. This prompts a search for alternative antifungal chemicals that are both effective and safe to use.

Recent research has indicated that aurones might possess antifungal capabilities, but no research indicates how aurones compare to standard antifungals. This research sought to compare an aurone (sulfuretin) to a common antifungal (clotrimazole) and compare their fungistatic and fungicidal abilities. Three different experimental tests were conducted: a Minimum Inhibitory Concentration (MIC) Assay and a Disk Diffusion Assay (DDA) were used to determine fungistatic ability, and a Minimum Fungicidal Concentration (MFC) Assay was used to determine fungicidal ability. The MIC and DDA revealed that sulfuretin possessed little to no inhibitory ability, and the MFC revealed that neither clotrimazole nor sulfuretin possessed fungicidal activity.

In summation, these results showed that sulfuretin does not possess any fungistatic activity comparable to clotrimazole, nor did sulfuretin display the fungicidal activity clotrimazole lacks. Therefore sulfuretin would not make a good alternative to standard antifungal options used currently. While sulfuretin did not possess any antifungal properties, other aurones may. Further experimentation involving different aurone species is required in order to better understand the overall antifungal properties of the chemical group.



## ORAL RESEARCH PRESENTATION



**Brandi Cook '22**

**Major:** Biology

**Minor:** Chemistry

**Activities:** Pre-Vet Club

**Adviser**

Deborah Austin, Professor of Chemistry

*An evaluation of Salmonella spp. and Escherichia coli in feline commercial raw meat-based diet and kibble*

Feeding a raw meat-based diet (RMBD) has become increasingly popular amongst pet owners. There is debate about whether pet owners should feed felines a commercial RMBD because of the potential for higher bacterial levels. Although cats have a gut microbiome to help aid in the homeostatic balance of bacteria, the entrance of bacteria through the diet can cause bacterial dysbiosis, causing vomiting, diarrhea, weight loss, and blood in the stool, which may lead to gastrointestinal diseases such as inflammatory bowel disease (IBD). The symptoms of IBD are acute at first but may worsen over time if not treated after diagnosis. Therefore, it is important to understand whether some foods are more likely to introduce larger quantities of bacteria into the feline diet than others.

This study quantified the amount of *Salmonella* spp. and *Escherichia coli* in various cat foods. The samples varied based on lot number, flavor, manufacturer, and type of food - commercial RMBD or kibble. The foods were homogenized in phosphate-buffered saline, serially diluted, plated on selective media for each bacterium, and incubated for growth. Samples were plated on Brilliant Green agar and modified to determine the number of *Salmonella* spp. present. Samples were also plated on MacConkey Sorbitol agar to determine the number of *E. coli* present.

While there were no statistically significant differences in *Salmonella* spp. among the food tested, there was a statistically significant difference in the amount of *E. coli* among the foods. A single lot of one brand of RMBD showed a statistically significant lower amount of *E. coli* compared to the other lots. There were no other statistical differences in amounts of *E. coli* in the remaining comparison groups. By analyzing additional foods we can better understand how bacteria is introduced via diet and reduce the risk of gastrointestinal diseases in felines.



### Kelsey Novak '22

**Major:** Environmental Sustainability

**Adviser**

Christine Mayer, Adjunct Professor of Environmental Studies and Director Fulton Center for Sustainability Studies

### *Practices for Environmental Change at Wilson College*

Wilson College is known for its efforts to become environmentally sustainable. Wilson has environmentally friendly projects already, such as reusable take-out boxes in the dining hall, several recycling bins on campus, Sarah's Cupboard, the campus food pantry, and food scraps from the dining hall are transported to the farm for composting. There are always ways to improve these efforts, though.

For my research, I explored two different opportunities for programs on campus. One is a re-store, and the other was to build upon current recycling efforts. The re-store is for the entire campus community to take their unwanted goods and make them available to others for free. Improving recycling efforts could be accomplished by educating the Wilson community and making recycling bins more abundant around campus.

Throughout this presentation, you will be able to see my thought process as to how I developed these choices, how each program could come to life, and how I hope future students will broaden my efforts by implementing these on campus.





## HONORS RESEARCH PRESENTATION



### Joshua Howells '22

**Major:** Biochemistry & Molecular Biology

**Activities:** Men's Golf, SAAC, & Omicron Delta Kappa

**Advisers**

Kathryn Sarachan, Assistant Professor of Chemistry

Brad Engle, Associate Professor of Biology

### *Effects of post-treatment Lyme disease syndrome and potential causes*

Lyme Disease is caused by the bite of either *Ixodes scapularis* or *Ixodes pacificus*, black-legged ticks found in North America. 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 migraines in severe cases.

Every year Lyme Disease affects 476,000 people nationwide, and 10-15% of them will develop Post-Treatment Lyme Disease Syndrome (PTLDS). PTLDS is defined as prolonged symptoms, including joint pain, fatigue, and neurocognitive problems, for at least six months following the initial antibiotic treatment for Lyme Disease. PTLDS is estimated to affect over 2,000,000 individuals in the United States.

No specific PTLDS biomarker has been found, making diagnosis and specific causes difficult to determine. Here, a correlation was sought between age of onset, antibiotics given, certain symptoms of initial Lyme, and time between infection and treatment of Lyme Disease with the diagnosis of PTLDS. Thirty surveys were received from twenty-two Lyme Disease patients who developed a PTLDS diagnosis and eight who completely recovered without further symptoms. Experimental factors were compared using t-tests.

Preliminary analysis indicated that the presence of a rash was a statistically significant predictor of the development of PTLDS. Further research with a larger sample size is indicated to confirm these results.

## HONORS RESEARCH PRESENTATION



### Jacob Slifka '22

**Major:** Biology

**Minor:** Chemistry, English, Education

**Activities:** USDA Research, Tutoring, General Chemistry Supplemental Instruction

**Advisers**

Brad Engle, Associate Professor of Biology

Sonny Bleicher, Visiting Assistant Professor of Biology

### *Quantifying the contact-independent inhibitory effect of cinnamon bark oil on the fungal pathogen *Pseudogymnoascus destructans**

The invasive fungus, *Pseudogymnoascus destructans* (P.d.) is the vector for white-nose syndrome, a condition that has been decimating bat populations across North America since 2006. Some volatile organic compounds (VOCs) show the ability to inhibit fungal growth while also having the capacity to penetrate porous material, such as the soil found in caves (hibernaculum) where P.d. grows.

We designed two experiments to determine if the VOC cinnamon bark oil (CBO) could be used as an inhibitor for this fungus. We additionally investigated whether CBO has detrimental effects on endemic cave fungi. We used i-plates as environmental/growth chambers placing known concentrations (ppm) of CBO placed on one side and colony-forming units (CFUs) of fungi on the other.

Two weeks of fungal growth, quantified using CFU counts, showed the CBO minimum inhibitory concentration (MIC) for P.d. was at 50ppm, or lower, with CBO also inhibiting three endemic *Pseudogymnoascus* species of fungi. Despite the effectiveness of CBO in suppressing the growth of P.d., the suppression of other fungi present in the hibernaculum makes CBO a risky treatment to utilize in natural environments.



## HONORS RESEARCH PRESENTATION



### Elijah Klopp '22

**Major:** Biology

**Minor:** Conservation Studies

**Athletics:** Baseball

**Advisers**

M. Dana Harriger, Professor of Biology

Sonny Bleicher, Visiting Assistant Professor of Biology and In collaboration with Katherine Mertes, Conservation Ecology Center, Smithsonian Conservation Biology Institute, Front Royal, Va.

### *Use of camera collars to monitor reintroduction risks to Oryx dammah, scimitar-horned oryx*

The scimitar-horned oryx (*Oryx dammah*) is a species of oryx that is extinct in the wild primarily due to human disturbance, over-hunting, drought, and livestock overgrazing. Present reintroduction efforts of captive-raised oryx have been successful in the enclosed Ouadi Rimé-Ouadi Achim Game Reserve in the African republic of Chad. This region is within the native habitat of scimitar oryx, spanning between the savannah habitat of the Sahel, and the Saharan Desert. Successful reintroduction will depend on monitoring for potential risks such as disease transmission, predation, and resource depletion.

This study evaluates one of the most comprehensive methods to monitor large game species with camera collars. Three focal oryx (a breeding male and two females) were fitted with collars at the Fossil Rim Wildlife Center in Glen Rose, Texas between April and May 2019. A total of 78 captured videos for each individual were uploaded and analyzed using Behavioral Observation Interactive Software (BORIS).

Using this software, we compared the interactions of the focal animals with a list of cohabitating species at Fossil Rim. The two females, one older and one younger, were more social than the male. The older female encountered more, and spent more time with, both conspecifics and other species than the younger one. All three oryx spent significantly more time with conspecifics (including an Arabian oryx) than with competitors or humans.

The results of this study, supported by field observations, demonstrate that camera collars are a useful tool for monitoring risk encounters and social behaviors of captive oryx and would be effective for the monitoring of oryx in a reintroduced environment.

## HONORS RESEARCH PRESENTATION



### Calista Wolfe '22

**Major:** Biology

**Minor:** Chemistry

**Activities:** Pre-Vet Club

**Adviser**

M. Dana Harriger, Professor of Biology

### *The comparative effects of a raw based diet versus a kibble diet on the reduction of dental calculus in dogs*

Periodontal disease (P.D.) is one of the most prevalent oral diseases found in dogs. P.D. is an inflammatory disease that results from infection of the gums, bone, and tissues surrounding and supporting the teeth. P.D. develops from excessive dental calculus buildup (DCB), the hardening of dental plaque, saliva, bacteria, and minerals. There are two stages of gum disease, gingivitis, and periodontitis. Without treatment, gingivitis will progress to P.D. The high percentage of dogs affected by P.D. renders it necessary to determine whether a dog's diet has an impact on the reduction of established DCB.

This study contained two groups of whippets that were fed different diets. The control group was fed the same kibble diet the test subjects were already consuming. The treatment group was fed a commercially available raw-based diet (RBD). The amount of DCB on the test subject's teeth was measured using a visual assessment scale that displays the stages of PD. Photos of the test subject's teeth and gums were taken every Tuesday and Friday for five weeks, then organized into grades of PD dependent upon the amounts of DCB present on the surface of the test subject's teeth. Statistical analyses were performed to determine whether there were significant differences between grade of P.D. and type of diet fed as well as any differences between DCB of the control group compared to the treatment group.

Results of this study do not indicate a correlation between diet and reduction of established DCB within the parameters of the study design. Further analysis is required to better understand the impact of diet on P.D. in canines.



## HONORS RESEARCH PRESENTATION



### Jacob Whittington '22

**Major:** Exercise & Biological Science

#### Advisers

M. Dana Harriger, Professor of Biology  
Tonia M. Hess- Kling, Associate Professor of Exercise Science  
In Collaboration with Rebecca R. Thomas, Somerset  
Physical Therapy, Princess Anne, Md

*Analysis on the outcomes of physical therapy on patients with shoulder injuries in different age groups*

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 the function of an injured joint by increasing mobility, decreasing pain, and reestablishing 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 investigated whether a younger population of patients (18-45 years old) responded better to physical therapy by developing more mobility and strength along with decreased pain in the shoulder joint after injury in comparison to an intermediate (45-60 years old) and older population of patients (61+ years old). Under the guidelines of the Health Insurance Portability and Accountability Act (HIPAA) and Institutional Review Board (IRB) approval, data was collected from patient files undergoing treatment for shoulder injuries at Somerset Physical Therapy. Data included age, gender, body mass index (BMI), upper extremity functionality index (UEFI), and the number of clinical visits. Data is being analyzed to determine if age can be a predictor of outcomes. A comparison of interest includes an examination of BMI as it relates to the number of visits needed for the younger population vs. the intermediate and older population.

Preliminary data suggests that a younger population of patients who undergo physical therapy for shoulder injuries have better outcomes than an intermediate and older population of patients.

## HONORS RESEARCH PRESENTATION



### Blanca Villeda '22

**Major:** Environmental Science & Chemistry

**Minor:** Biology

**Activities:** Muhibbah Club, InterVarsity and Archery

**Adviser**

Deborah Austin, Professor of Chemistry

*A comparative study of primary land use and microplastic concentrations of sediment in the Conococheague Creek*

Plastics are ubiquitous today due to their wide range of applications and affordability. Microplastics, plastic debris less than 5 mm in length, are known to be ingested by different freshwater organisms. Once ingested, microplastics can obstruct the organism's digestive system and clog their feeding appendages.

This study investigated whether microplastics are present in the Conococheague Creek and whether there is a correlation between primary land usage and microplastic concentrations in the Conococheague. The Conococheague is a tributary of the Potomac River, which flows into the Chesapeake Bay. It is also the source of drinking water for the Borough of Chambersburg. Four areas of study along a 20-mile reach were chosen based on the land use the creek is flowing through: the headwater of the creek, a recreational area, an agricultural area, and an urban area.

Three sediment samples were collected from each site. Microplastics were separated from sediment based on density using zinc chloride (specific gravity 1.6 g/ml) stained with rose bengal dye and identified by stereomicroscopy. Observed microplastics were classified based on their shape: fragments, films, fibers, and other. Microplastics were present in all samples, but there was no statistical difference between the average number of microplastics per dry weight between the four sites. The most abundant type of microplastic in all samples was microfibrils. However, there is a trend in the composition of microplastics among the samples. The urban site had the most diverse composition of microplastics, followed by the agricultural site, the recreational site, and finally, the pristine site.

This study indicates that microplastic contamination occurs at multiple locations along this reach of the Conococheague Creek. Further studies could elucidate points of contamination along the creek and whether the microplastics are affecting the organisms in this aquatic habitat.





## Shaylene Vargas '22

**Major:** Biology

**Activities:** SPS program

### Advisers

Kathryn Sarachan, Assistant Professor of Chemistry

Brad Engle, Associate Professor of Biology

### *The combinatorial effects of lumefantrine and tetrandrine on the radiation sensitivity of U-87 glioblastoma cells*

Glioblastoma is the most common and aggressive malignant brain tumor with a 15-month median patient survival time. Although radiotherapy and temozolomide (TMZ) treatment are often prescribed as life-prolonging therapy, glioblastoma cells are known to show significant resistance to both radiation and chemotherapy. Lumefantrine, an antimalarial drug, has been found to reverse the radiation/TMZ resistance of glioblastoma cells, and tetrandrine, a phytochemical, has been found to increase glioblastoma cell sensitivity to radiation.

The primary purpose of this study was to determine the combinatorial effects of tetrandrine and lumefantrine on the radiation sensitivity of U-87 glioblastoma cells. Glioblastoma cells were plated in 96 well plates, incubated for 24 hours, treated with various concentrations and combinations of lumefantrine and tetrandrine, exposed to UVC radiation or not. There were 12 treatment conditions, including the control, DMSO, and the MTT blank, with 16 replications per treatment condition. Results were quantified using an MTT cell viability assay. Preliminary results produced several notable findings compared with the control (no drug or radiation treatment), 1) the vehicle for the drugs, DMSO, showed reduced cell viability; 2) there was no apparent difference in cell viability following radiation treatment; 3) lumefantrine when used independently, resulted in a trend of dose-dependent decrease in cell viability; and 4) the combination treatments appeared to have a proliferative effect on the cells.

Overall, the results of this study are inconclusive with respect to the combinatorial effect of lumefantrine and tetrandrine on the radiation sensitivity of U-87 glioblastoma cells. Further studies will be necessary to determine the potential therapeutic value of lumefantrine and tetrandrine used in combination with radiation for the treatment of glioblastoma.

## HONORS ORAL RESEARCH PRESENTATION



### James Pasaribu '22

**Major:** Psychology/Philosophy

**Activities:** WCGA (V.P., 2020-2021), R.A. (2021-2022), PHNX Esports (Overwatch, Co-captain; League of Legends, Captain), Curran Scholar, Gamers Club (President), Psychology Club (Treasurer), Pi Gamma Mu, Phi Beta Kappa

**Advisers**

Steve Schmidt, Associate Professor of Psychology  
John Elia, Associate Professor of Philosophy

### *Effects of Sense of Belonging for International Students and their Academic Performance*

International students face the unique challenge of needing to perform academically in an environment that is often very different from their home countries. Studies showed that an international student's sense of belonging to the university and the people within were able to predict academic performance (Glass & Wesmont, 2014; Poyrazli & Isaiah, 2018).

This study sought to identify factors that promoted or risked sense of belonging in international students (social support network, campus diversity climate, homesickness, and perceived prejudice/discrimination) and the relationship between their feelings of belonging and their ability to perform academically. An intervention plan was devised with activities that were aimed at improving overall sense of belonging of international students at Wilson College. A control condition was used to compare the results of the intervention group versus control. Participants were randomly assigned into the intervention ( $n = 2$ ) or control groups ( $n = 2$ ).

Due to the small sample size of the study, quantitative results could not be calculated with precision; however, numerical trends hinted that the control group deteriorated in scores of sense of belonging while the intervention group managed to hold steady throughout the semester. Although the small sample size is the most considerable limitation of this study, future research can replicate this intervention with incoming classes to see if the numerical trends can be repeated.





## Camryn Mountz '23

### *Collecting Data of Past and Present Attacked Trees from European *Lymantria Dispar* at Michaux State Forest to Create Potential Future Infestation Predictions*

#### **Advisers**

Deborah Austin, Professor of Chemistry

Sonny Bleicher, Visiting Assitant Professor of Biology

A continuous fight to control the invasive species, the gypsy moth, has been ongoing since the first introduction in the late 19th century. Gypsy moths kill a variety of trees and defoliate many forests each year, causing species to become close to endangerment. Gypsy moths are known to attack primarily oak species with a great crown structure, causing a significant decrease in oak trees. This decrease in oaks and other tree species gypsy moths are attracted to, depletes wood resources from homes and other organisms which rely on trees for habitats.



In mid-May, the European Gypsy moth hatches and will begin searching for a viable host tree. By collecting data, at Michaux State forest, of previously attacked trees in May and comparing it to data of present attacked trees in September, there will be some comparative data to provide predictions on where gypsy moths are going to spread. Software will be used to calculate the significance of the data as well as if this method will assist in making future predictions of the location of potential host trees.

This prediction will allow individuals to spray potential host trees before an infestation occurs, therefore, helping decrease the spread of the destructive invasive species.

## Morgan Wineburg '23

### *Evaluation of invasion on human glioblastoma cancer cells when introduced to the beta blocker propranolol*

#### Advisers

Kathryn Sarachan, Assistant Professor of Chemistry

Brad Engle, Associate Professor of Biology

Approximately, 250,000 people in the world are diagnosed with glioblastoma, and 200,000 die from the disease. It is the deadliest form of brain cancer, with an average age of incidence peaking at 75-84 years. One important factor in clinical outcomes from cancer is invasiveness. Glioblastoma has a high rate of invasion, causing the cancer to become metastatic. Studies have shown that beta blockers, specifically propranolol, can stop the invasion of various cancerous cells.



The proposed research will consist of four groups to assess the ability of propranolol to arrest invasiveness in glioblastoma cell cultures. One group will be a control with no beta blocker added. The experimental groups will be given 0.5, 1.0, and 2.0  $\mu\text{l}$ , respectively. The cultures will follow standard incubation protocols and incubate at 37°C for 24 hours. The cell cultures will be treated with propranolol for 48 hours. After this time, the cultures will receive fresh media and incubate for another two hours. Following incubation, the supernatant, liquid above the solid residue, will be removed, and dimethyl sulfoxide is added for 30 minutes to dissolve the crystal.

For statistical significance, each treatment will be replicated ten times to obtain a clearer understanding of the effects of propranolol. A cell invasion assay will be used to quantitate the degree to which treated and untreated glioblastoma cells penetrate a barrier. The results will be compared to determine if propranolol mitigates the invasion of cancerous glioblastoma cells.



Kelly Lepouski '23

*Combination effects of epigenetic drugs, Nexturastat A and 5-Azacytidine, on Glioblastoma cells*

**Advisers**

Kathryn Sarachan, Assistant Professor of Chemistry

Brad Engle, Associate Professor of Biology

Many cancers, including glioblastoma (GBM), are difficult to treat, have low survival rates, high recurrence rates, and develop resistance to conventional treatments. There are genetic and epigenetic factors that play a role in these undesired outcomes. For cancers such as GBM, the development of alternative therapies is essential for a better prognosis.

Recent research has identified epigenetic factors, including DNA methylation, histone modification and small noncoding RNAs (miRNAs), that are altered in many cancers. Some of these changes in the cancer epigenome can be reversed with epigenetic inhibitors, such as histone deacetylase inhibitors (HDACi) and DNA methyltransferase inhibitors (DNMTi) leading to new therapeutic approaches. The use of single inhibitors has shown limited success. However, combination therapies have shown more positive results.

This study is designed to test the efficacy of Nexturastat A (HDACi) and 5-Azacytidine (DNMTi) used alone and in combination on glioblastoma cells.

Glioblastoma cells will be cultured in Dulbecco's Modified Eagle Medium (DMEM) containing 10% fetal bovine serum (FBS) and penicillin/streptomycin at 37 degrees C in humidified 5% CO2 atmosphere. For drug treatment and analysis, cells will be plated in 96 well plates containing 5,000 cells per well, and the percent cytotoxicity will be determined using an MTT assay. Dose-response curves will be generated (0 to 50 micromolar concentrations) using four different treatment conditions: no treatment, HDACi alone, DNMTi alone, and HDACi and DNMTi combined. It is anticipated that the combined treatment will be more effective than either treatment alone. An observed synergistic effect may show promise as an alternative treatment for GBM.



## Alexis Alleman '23

### *A study of musculoskeletal symptoms and the results of Lyme disease tests*

#### **Advisers**

Deborah Austin, Professor of Chemistry

Adam Cooke, Instructor of Biology

According to the CDC, Lyme disease is the number one vector borne disease in the United States with approximately 20 to 30 thousand people diagnosed per year. Most cases of Lyme disease go undiagnosed for a period of time because the symptoms are associated with other conditions.

Early diagnoses is important because treatment is more effective in early stages of the disease. Therefore, it is important to develop new tools which can help doctors make an early diagnosis. There are four different types of tests that are utilized to diagnose Lyme disease.

The purpose of this study is to observe whether there is a correlation between musculoskeletal symptoms and a positive test result. A survey will be given to three different doctor's offices in a three-county region in Pennsylvania that specialize in treating Lyme disease. Patients will be asked to complete the survey anonymously. Data will be analyzed to determine whether a correlation exists between positive test results, the type of test used, and musculoskeletal symptoms.

This information may encourage physicians, if they see musculoskeletal symptoms, to test for Lyme disease sooner, which could lead to a diagnosis in a shorter period of time.



Ryder Wallace '23

*Multifactor analysis of the spread of tick-borne diseases  
Anaplasmosis and Babesiosis*

**Advisers**

M. Dana Harriger, Professor of Biology

Sonny Bleicher, Visiting Assistant Professor of Biology

Deer ticks (*Ixodes scapularis*) are parasites found throughout the East Coast and Midwestern regions of the United States. These parasites are responsible for about 95% of all vector-borne diseases. *I. scapularis* prefer to feed on animals such as deer and mice but sometimes become the parasite of human blood. *I. scapularis* carry an array of diseases that they often transmit to the host during feeding. The most prevalent disease transmitted to human hosts is Lyme disease.



Lyme disease is the most common vector-borne disease in the United States. The first cases of Lyme disease in the United States were reported in the mid-1970s in Connecticut. Since then the disease has spread down the East Coast, reaching portions of North Carolina. The disease incidence has doubled within the past 20 years indicating an increase in trend. Other vector-borne diseases transmitted by *I. scapularis* include Babesiosis and Anaplasmosis. Both of these diseases are fairly contained to the New England area at this point in time.

Using a spatially dependent data mining project, I aim to understand the conditions that could lead to the spread of Babesiosis and Anaplasmosis and identify locations for the risk of spread of these diseases in the near future. I will then compare the increase in prevalence to that of Lyme disease. I will be using a spatially explicit software model that analyzes factors and data such as *I. scapularis* populations, temperature levels, human population density, terrain, forest coverage, white-tailed deer population levels, white-footed mouse population levels, and case study locations for both diseases. These factors and dynamics will then be used to create a map model.

Based on results from data collected and models produced, I will provide a prediction as to what the geographic incidence and prevalence look like for Babesiosis and Anaplasmosis on the East Coast.

Kara Rosander '23

*Comparative study of the effects of buffer regions and heavy rain on microplastics in the Conococheague Creek*

**Advisers**

M. Dana Harriger, Professor of Biology

Adam Cooke, Instructor of Biology

Water pollution is a very important global issue. It is estimated that 14000 people die each day from water pollution worldwide. Water pollution is defined as a change in physical, chemical, and biological characteristics which can cause harm to human and aquatic life. Pollutants can be defined as a substance that enters the air, soil, or water and causes an adverse effect that renders it to be unfit for its specific use.

This study will examine samples of water collected in Conococheague Creek in Chambersburg, Pa., for microplastics. The Conococheague Creek is Franklin County's drinking water supply, and it is important to test for microplastics in the creek because they can be harmful to aquatic life and have potential harm to humans. Microplastics are plastic particles that are less than 0.5mm and these can enter water sources and, specifically, the creek through surface water runoff after heavy rain, wastewater that has been treated or untreated, industrial effluent, degraded plastic waste, and atmospheric deposition.

This study will investigate whether the introduction of microplastics into the Conococheague Creek is correlated with precipitation and whether the use of buffer regions can reduce the amount of microplastic contamination. Vegetated buffer regions function to reduce the amount of pollution that can enter a water source. These buffer regions can do this by intercepting the source of pollution or by absorbing it.

It is important to understand what pollutants are present in freshwater ecosystems in order to identify the sources for which pollutants are getting into the water and to be able to lessen the negative effects.



Emily Frye '22

*How Veterinary Medicine Schools Can Address the Increasing Rate of Suicide Among Veterinarians*

**Adviser**

Julie Rauli, Professor of Sociology

Research shows suicide rates among veterinarians in the United States are twice that of the general public. Veterinarians attend approximately eight years of school to become educated about the treatment of varied animal species. Most of their education relates to the care of patients; minimal course work is provided on how to deal with the stress and fatigue of their working environment.

Studies demonstrate veterinary medicine education fails to provide adequate course work on death and bereavement and lacks support for students who may struggle with these issues. Euthanasia procedures, in particular, are taught to veterinary students, but education on how to handle such procedures mentally is often missing in veterinary medicine curricula. A lack of education on such serious topics can lead to early burnout, mental health problems, and even suicide.

My study looks at how veterinary medicine schools can address the increasing rate of suicide among veterinarians.



Daeshaun Johnson '23

*How Institutional Supports Affect Single-Parent Scholars' Success in Higher Education*

**Adviser**

Julie Raulli, Professor of Sociology

Research shows that single parenthood coupled with poverty create difficult circumstances for college students. Several single-parent student programs exist in higher education to empower low-income students by providing institutional supports and financial resources.

In these programs, students are given opportunities to secure a convenient living situation for their children, which leads to greater academic success and economic security. Additional program supports include scholarships, extended networking connections, and educational assistance.

This study explores the institutional support factors that influence low-income single-parent scholars' academic success in these college programs.





## POSTER RESEARCH PRESENTATION

Catarina Keifman '23

*Minimizing Sexual Assault and Maximizing Reporting: Critical Considerations in Constructing Campus Policy*

**Adviser**

Julie Rauli, Professor of Sociology

Sexual assault reporting rates remain low even after the height of the #MeToo Movement, especially on college campuses. "Another reckoning over sexual assault in U.S. colleges is starting. Officials must listen," reads a 2021 headline from The Guardian newspaper. Recent news of sexual assault report mishandling is popping up across the United States and internationally as young people struggle to have their voices heard and their cases brought to justice.

Popular articles report a variety of problems relating to campus sexual assault policy; some raise concern over colleges' lack of mandatory reporting, and others complain of mishandling of sexual assault allegations despite mandatory reporting.

Amidst this outrage scholarly studies provide a wide range of policy suggestions on changes that can create a campus environment that will have the best results in lowering instances of sexual assault while increasing reporting rates.

My research integrates scholarly studies on campus sexual assault reporting with the goal of creating a thorough, ideal policy outline for U.S. college campuses.



Amanda Smida '23

*Post-Incarceration Opportunities for Women of Color in the United States*

**Adviser**

Julie Raulli, Professor of Sociology

Race is a crucial factor in the U.S. criminal justice system. Studies show that minority groups within the United States are more frequently targeted by police compared to their white counterparts due to negative stereotypes.

In particular, imprisonment rates for Black and Latina women have risen over the past several decades because of the war on drugs. The label of a criminal record has a huge impact on the life chances of individuals that have been convicted of crimes.

Opportunities for individuals' post-incarceration are significantly reduced, especially for women of color. Such opportunities include employment, health care, housing, and childcare.

My research explores the factors that affect the lives of women of color post-incarceration.



Chloe Perrin '22

*Children with Incarcerated Fathers: What Are the Consequences?*

**Adviser**

Julie Raulli, Professor of Sociology

The United States imprisons more of its population than any other industrialized nation. There are now approximately 1.9 million individuals living in confinement. According to the Southern Poverty Law Center, mass incarceration is increasingly recognized as a crisis in public health, human rights, civil rights, and racial equality. But what does mass incarceration mean for children? Recent estimates suggest that approximately 2.7 million U.S. children have a parent living behind bars.



Scholars in many disciplines have conducted research on the consequences children face if they have an incarcerated parent, especially a father or step-father. Studies show that paternal incarceration effects children in myriad ways, including interactions with peers, family, and schools. The impact of mass incarceration in the U.S. therefore not only effects those who are imprisoned, but their children as well. This study investigates the consequences on children who have fathers or father figures behind bars.

## POSTER RESEARCH PRESENTATION

### HSC 216: Human Anatomy and Physiology II

*Muscular Amyotrophic Lateral Sclerosis*

*Crohn's Disease*

*Catecholaminergic Polymorphic Ventricular*

*Tachycardia*

*Cystic Fibrosis*

*Vasculitis*

*Multiple Sclerosis*

#### **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 and serve as a platform to convey pertinent facts and concepts to the community, thereby helping to raise general awareness.

#### **Group Poster Topic and Group Members**

##### *Muscular Amyotrophic Lateral Sclerosis*

Drew Alldredge

Kylie Greek

Michaela Oberholzer

Benjamin Tunnell

##### *Cystic Fibrosis*

Nathan Dorsey

Delaney Glazer

Jamie Smith

##### *Crohn's Disease*

Shane Bowie

Emily Brechbiel

Brandom Rios

##### *Vasculitis*

Abigail Buck

Toni Senn

Ryder Wallace

##### *Catecholaminergic Polymorphic Ventricular Tachycardia*

Paige Albright

Anna Frohm

Marcus Moreno

##### *Multiple Sclerosis*

Emma Bounds

Melanie Hockensmith

Gillian Walters



## POSTER RESEARCH PRESENTATION

*ACC 301: Auditing/Assurance*

*ACC 307: Cost Accounting*

*ACC 322: Taxes II*

**Adviser**

Joseph Cunningham, Associate Professor of Accounting

Accounting rules and standards are crucial elements in the functionality of our economy and capital markets.

These rules and standards, originating in both the private and public sectors, are essential in providing adequate information to make important decisions regarding the purchase of investments or granting the extension of credit in the marketplace.

Accounting rules and standards place information in the proper context. These rules and standards are important to regulators such as the Securities Exchange Commission and Internal Revenue Service. Both organizations ultimately serve the taxpayer.

Further research in the application of accounting rules and standards is necessary to understand their effects on an enterprise level as well as on the economy. These posters have the intent of furthering such research.

### Group Poster Topic and Group Members

#### STUDENT

#### TOPIC

Brandt Mellott

*Benefits of Effective Cash Flow Management*

Kristen Nicholas

*Were the Tax Cuts and Jobs Act of 2017 Beneficial to the Economy?*

Baylen Snyder

*Practical Methods to Reduce an IRS Audit for Individuals*

Zachary Sutherland

*Corporate Benefits of the Audit Process*

Claudia Umbrell

*Indications of Corporate Fraud*

Makenzie Weyandt

*Are Corporations More Ethical Since Sarbanes-Oxley?*

## POSTER RESEARCH PRESENTATION

### BIO 270: Biology of Cancer

#### Advisers

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

Join the students enrolled in Bio 270, Biology of Cancer, and engage with them as you learn about various types of cancer. Posters will reflect a comprehensive presentation of knowledge that the students gathered as they researched specific forms of cancer.

This student-centered, active learning experience incorporates the scientific poster presentation to foster learning of cancer biology. Students successfully mined primary literature to collect information ranging from epidemiological data on incidence and population trends, to suspected correlations to exposures and heritable factors, to current and trending diagnostic and therapeutic approaches.

Students also include information gathered from their experiential component in which they contacted and/or interacted with a variety of experts on the front lines of cancer biology ranging from oncologists and researchers to foundations and support groups. An overlying goal of the poster project was to substantially enhance the depth of understanding of cancer biology as well as provide a forum for an educational opportunity to convey facts and concepts about cancer to the broader community.

#### Group Poster Topic and Group Members

STUDENT	TOPIC
Connor Bowers	<i>Impact of Agent Orange on Cancer Cases</i>
Elizabeth Deboer	<i>Osteosarcomas</i>
Madison Delsignore	<i>Basal-cell Carcinomas</i>
Makenzie Dowell	<i>Non-Hodgkin's Lymphoma</i>
Alandra Kuhns	<i>Oral Cancer</i>
Kayla McHugh	<i>Pediatric B-cell Acute Lymphoblastic Leukemia</i>
Paige Reynolds	<i>Hemangiosarcoma in Canines</i>
Elizabeth Vuxta	<i>Multiple Myeloma</i>
Morgan Wineburg	<i>Non-Hodgkin's Lymphoma</i>
Jade Wolfe	<i>Pulmonary Large Cell Neuroendocrine Carcinoma</i>



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.

**Mary Beth Wert**

*Instructor of Veterinary Nursing*

**Daniela DiGregorio**

*Assistant Professor of Education - TESOL*

**Kathryn Sarachan**

*Assistant Professor of Chemistry*

**Ela Rossmiller**

*Assistant Professor of Global Studies*

**Denise Sandell**

*Director of Library Services*

**James D'Annibale**

*Director of Educational Technology*

**Melodie Hoff**

*Administrative Assistant to the Vice President, Academic Affairs*

**Ronda Ranalli**

*Administrative Coordinator, Academic Affairs*

**Dianna Heim**

*Director, Strategic Relationship Development*

**Darrach Dolan**

*Content Developer/Managing Editor*

Wilson College Student Research Day highlights the research, scholarship, creative activities and achievements of students and their faculty mentors.



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