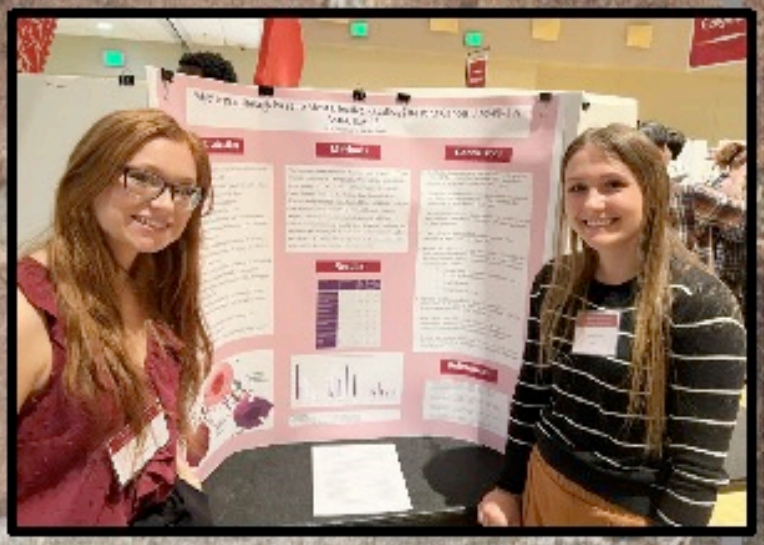
2024 FSU Undergraduate Research Symposium



Lane Center

May 3rd, 2024
11:00 a.m.-2:00 p.m.

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THE ABSTRACTS

This Symposium includes 84 presentations featuring the work of 139 students, mentored by 46 Faculty and Staff from all three Colleges of Frostburg State University. The projects presented at this Symposium took place in 2023 and 2024 and include coursework and independent study activities. Abstracts are organized alphabetically by college, then by department or college program, and finally by project title. The location of the poster or physical display in parentheses following the title refers to the table locations in the ARMAH. Oral presentations are scheduled in Lane Center 108, 110, 111 and 113. A map of the ARMAH and the schedule for the oral presentations are at the end of this abstract booklet. Each presentation includes the following information:

Project Title (Poster or Physical Display with Table Number; Oral Presentation with Room Number and Time)

Name(s) of presenting student(s)
Name(s) of contributing student(s) (if applicable)
Name(s) of faculty/staff mentor(s)

COLLEGE OF ARTS, HUMANITIES, AND SOCIAL & BEHAVIORAL SCIENCES

COMMUNICATION DEPARTMENT

Maximizing Impact: Leveraging Social Platform Analytics for Enhanced Engagement and Outreach (Oral Presentation: Room 110 from 12:00-12:30)

Presenting Student: Jermya Williams
Faculty Mentors: Dr. Elesha L. Ruminski, Dr. Sudipto Sarkar

In today's digital era, organizations are constantly striving to maximize their impact and reach in their respective industries or communities. One powerful tool that has emerged as a game-changer in this pursuit is social platform analytics. This presentation delves into the importance of leveraging social platform analytics to enhance organizational impact and outlines actionable steps for implementing this method effectively. The advent of social media platforms has revolutionized how organizations connect with their target audience. However, simply having a presence on social media is not enough; understanding audience behavior and preferences is crucial to drive meaningful engagement and outreach. This is where social platform analytics come into play. By analyzing data metrics such as engagement rates, reach, impressions, and audience demographics, organizations can gain valuable insights into what content resonates most with their audience and tailor their strategies accordingly. Today, more than ever, organizations need to be data-driven in their decision-making processes. Social platform analytics provide a treasure trove of information that can guide strategic decisions and optimize resource allocation. For instance, by identifying peak engagement times or preferred content formats through analytics, organizations can schedule posts strategically and create content that aligns with audience interests, thereby increasing visibility and engagement. Implementing social platform analytics is not just about monitoring metrics; it's about deriving actionable insights and taking concrete steps to improve performance. For example, conducting A/B testing on different content variations based on analytics insights can help determine which approach resonates best with the audience, leading to more effective communication strategies. Furthermore, social platform analytics enable organizations to track the success of their outreach efforts in real-time. By monitoring key performance indicators and campaign metrics, organizations can make data-backed adjustments on the fly, ensuring that their efforts are yielding the desired results. In conclusion, leveraging social platform analytics is not a luxury but a necessity for organizations looking to enhance their impact and outreach in today's digital landscape. By embracing data-driven strategies, organizations can stay ahead of the curve, connect with their audience more effectively, and ultimately achieve their goals with greater success.

Working to Live to Work? Repairing a Burnt-Out Workforce by Improving the Work-Life Balance (Oral Presentation: Room 110 from 12:30-1:00)

Presenting Student: Amanda Stanley
Faculty Mentors: Dr. Elesha L. Ruminski, Dr. Nancy Giunta

Employment is a necessity for many in the modern United States lately, attitudes towards gainful employment have been changing. In a Deloitte survey in 2015, it discovered 64% of employees held negative attitudes towards their jobs. According to Gallup and to The American Institute of Stress, in 2023, 80% of Americans are dissatisfied at work and 63% of U.S. workers report they're ready to quit their job to avoid work-related stress. The current generation is starting to reconsider the effects of work on their lives and whether the quality of traditional work-life balance is worth their time. This presentation will go over the issues that are commonly found in the workplace such as poor benefits, contributors to burnout, and employee dissatisfaction. The possible solutions to address them such as better access to support resources, management techniques, and outlets for employees. It will also be revealed how making these changes could improve company production. The significance of this presentation will be revealed as examples and cases from real life are given. This is an experience many people have been affected by and many people want to see a positive change. The audience will have opportunities to share their experiences and learn how to spark a difference as this dilemma is explored.

ENGLISH AND FOREIGN LANGUAGES DEPARTMENT

Description of Small Molecule Drugs for Cancer Treatment (Poster: Table 15)

Presenting Student: Carolyn DeSena
Faculty Mentor: Dr. Kristin Shimmin

Small molecule drug treatments for cancer, while still considered novel treatments, are a fast-growing area of research for cancer treatment, but are not very well known to patients. The purpose of this White Paper Report is to both provide a description of small molecule drugs and explain how some specific small molecule drugs work as a cancer treatment. The techniques being used to complete this research project are independent research and analysis. Since there are many different types of chemotherapy treatments that a cancer patient could possibly use, finding the best treatment for the specific type of cancer is difficult to accomplish. For small molecule drugs, there are three different groups; inhibitors which include the drug Lapatinib, agonists/antagonists which include the drugs Bicalutamide and Imiquimod, and ion channel modulators which includes the drug Riluzole. Although each drug has its own mechanism of action, they each treat cancer in a way that prevents the damage of healthy cells. In conclusion, small molecule drugs are an effective way to treat specific types of cancer.

Irresistible Instagram: The Negative Effects of this Social Media Platform on Adolescents (Oral Presentation: Room 113 from 11:30-12:00)

Presenting Student: Alyssa Kush
Faculty Mentor: Dr. Amy Armiento

In this paper, I argue that, although many adolescents in the United States feel connected when they use Instagram, it negatively affects some of them because it promotes competitive body image expectations and unproductive use of time, which can lead to mental health issues. Since many influencers are getting paid to promote an item, it sets up a false idea that viewers need to buy these products to be more liked and attractive. Depending on how much a person believes they look or act the way the influencers say they should determine how they feel about themselves. In a study conducted in 2020, researchers concluded that social media and self-esteem go hand in hand. They have a negative correlation, which means the more time spent scrolling the more likely one will feel bad about themselves. This presentation offers steps to address the issue, moving Instagram users toward a happier and healthier life.

ISO ISAs: The Implications of *Watchmen*'s Commentary on Ideological State Apparatuses (Oral Presentation: Room 113 from 12:30-1:00)

Presenting Student: Mason Wolf
Faculty Mentor: Dr. Amy Armiento

Watchmen by Alan Moore and Dave Gibbons uses the fictional Keene Act as the main catalyst for the events of the novel; this act makes it impossible for many of the former superheroes to continue their work because they are required to work for the government rather than outside of it. Moore has effectively developed it as a tool for examining the range of reactions that people, vis-à-vis the characters, may have when faced with the knowledge of their involvement or entrapment in various Ideological State Apparatuses (ISAs). By examining *Watchmen* through Louis Althusser's concept of ISAs paired with Michel Foucault's ideas regarding panoptic surveillance, a close reading of textual evidence demonstrates that the characters within the novel respond to ISAs in ways that represent the various real-world responses to one's interpolation in an ISA. The political ISA and the communication ISA take center stage in this novel and function as the main vehicles for repression. This research guides readers through the various hallmarks of an ISA, which helps them to discover the significance of ISAs in their own lives. *Watchmen* provides a complex and nuanced look into American ISAs upheld in part by panoptic surveillance. The implications of this research are also significant because they further *Watchmen*'s advancement toward being accepted in the literary canon while also cementing the graphic novel as a legitimate form of critical literature.

Obtaining a Disability Studies Consciousness in *The Curious Incident of the Dog in the Nighttime* (Poster: Table 15)

Presenting Student: Alivia Melius
Faculty Mentor: Dr. Amy Armiento

This paper argues that Mark Haddon's *The Curious Incident of the Dog in the Nighttime* is a way to engage in a disability studies consciousness through the story's narrator Christopher Boone. Drawing upon Lennard J. Davis's "Constructing Normalcy," this essay identifies the language, mannerisms, and relationships that characterize Christopher as abnormal, and as the story's narrator, he challenges audiences to engage with his ways of thinking. Davis asserts that entering a disability studies consciousness is how readers can begin to change the narrative of what is "normal" in our literature and culture. Close reading of the textual evidence reveals Christopher as an introspective character from whom we can learn, both about ourselves and the mind of a boy who lives outside of the norm. This book bridges the gap between understanding the world from a neurotypical perspective and that of a neurodivergent one. Readers can see the world from a different perspective they may not have considered, as well as even find comfort and relatability in Christopher's thoughts, actions, and reasoning.

Rare Marbled Salamanders and How We Can Help (Poster: Table 15)

Presenting Student: Lacey Moyers
Faculty Mentor: Dr. Kristin Shimmin

The purpose of this paper is to have a better understanding of marbled salamanders and their habitats to protect them and increase their numbers. Marbled salamanders are an extremely rare species that is struggling to find sufficient habitat all over the world. Integrating specific management techniques is the best way to ensure the marbled salamanders do not go extinct. Monitoring things such as movement patterns and hatching plasticity is the best way to stay informed of how we can protect the marbled salamanders. We can do this by implementing specific habitat areas just for the marbled salamander and by monitoring them for long periods of time. I did a literature review and found ten good sources about marbled salamanders by doing keyword searches. The themes of the sources include hatching plasticity, water quality, coloration, camera traps, streamside management zones, and how they all affect the movement or survivability of marbled salamanders. Marbled salamanders have movement patterns that are based on several factors. These factors include the types of trees around the water where the salamander lives, coloration, size, and even hatching plasticity. Small changes in any of these categories can cause the salamanders to either move or die. This is a major issue with marbled salamanders being such a rare species. To address this problem, management techniques such as lengthy monitoring of their populations and specific areas focused solely on increasing marbled salamander numbers are being introduced. More research needs to be done on the marbled salamander to ensure that we are helping the species and not harming them further.

What it Takes to be a Man (Oral Presentation: Room 113 from 12:00-12:30)

Presenting Student: Hannah Lebo
Faculty Mentor: Dr. Amy Armiento

In this paper, I argue that, during the early twentieth century in the United States, men were typically seen as the superior gender and had many expectations to fulfill. This phenomenon is also present in literature of that time. Previous scholars have already established that males were viewed as the superior gender, exhibiting traits such as strength, power, confidence, intelligence, and courage. For instance, in the article, Masculinity as a Cultural Concept, written by Mary Hurd, she states, that “male characters in war or action films are depicted as aggressive and violent.” I apply these views to William Howells’s short story “Editha,” published in 1905. In the article, “A Man, So Very Nearly Perfect” by Christopher Johnston, he states, “George just needs that one experience, the one that will perfect him as a man” (257). This experience is going to war. To further this argument, I use close readings of the text to establish that, throughout history and into today’s society, these expectations are all required to achieve the idealistic image of a man.

PSYCHOLOGY DEPARTMENT

Effect of Conspecific and Predator Surveillance on Eastern Grey Squirrel (*Sciurus carolinensis*) Caching Behavior (Poster: Table 11)

Presenting Student: Lily Johnson
Faculty Mentors: Dr. Erica Hoy Kennedy, Dr. Thomas Lambert

This study examines the causal relationship between predator and conspecific surveillance and changes in the caching behavior of Eastern grey squirrels (*Sciurus carolinensis*). It was conducted on the Frostburg State University campus and in low foot traffic areas in Lonaconing, Maryland, and Barton, Maryland to assess the possible impact of human activity on the natural processes of rodent species. This is especially important because rodents are imperative to the distribution of oak tree species, one of the most abundant tree types in the Appalachian Mountain region. Three treatment groups were formed – a control group with no decoy present, a group with a conspecific decoy, and a group with a predator owl decoy – and offered a selection of fifteen white oak acorns to forage from. Using game camera footage, photographs, and concealed researcher observation, the distances to cache sites, density of tree cover, evidence of caches or other foraging behaviors (e.g. eating in place or dropping), and presence of fake caches or deceptive behavior were measured. It was expected that, based on the literature regarding rodent caching behavior, the Eastern grey squirrel would create more fake caches, engage in deceptive behaviors, and cache in low-quality areas of the habitat with sparse tree cover when surveilled by a conspecific. Contrastingly, it was expected that, when surveilled by a predator, the Eastern grey squirrels would choose to minimize their time in the open by feasting in place or dropping food immediately upon viewing the predator. An analysis of variances test was used to compare mean measures for each of the dependent variables, and it was determined whether any changes between the control group measurements and treatment group measurements were in the positive or negative direction. At present, data is still being collected, but preliminary results will be available.

Professor-Student Rapport: Exploring Variance Based on Gender Identity (Poster: Table 11)

Presenting Student: Faith Myers
Faculty Mentors: Dr. Jennifer Flinn, Dr. Kathleen Jocoy

The present study investigates the relationship between professor-student rapport and gender identity. Although there is a large variety of research on therapist- client relationships, as well as the correlation between a strong professor-student rapport and student success, there is limited research on the development of that rapport. Also, there is limited research available on the subject that takes gender into account. Using a Two-by-Two Factorial design, this study analyzed students

answers to the professor-student rapport scale, or PSRS (Wilson, Ryan, & Pugh, 2010). It is hypothesized that there will be variance in the rapport developed based on the gender of the student, as well as the gender of the professor. More specifically, it is hypothesized that although professors will be rated highly regardless of gender, students will report having generally higher rapport with female professors. This is due to female counselors and professors being rated generally higher in both therapeutic settings and student evaluations. Data collection was conducted at a mid-size regional university. Data will be collected by volunteers in undergraduate courses near the end of the semester to ensure that there has been time for rapport to adequately develop. Although Gender non-conforming identities were included in our measure, there were not enough participants to investigate the results of these identities. Our results were unable to claim a statistically significant relationship between professor-student rapport and gender identity. That said, this is likely due to a small sample size, and inadequate power. Results indicated a trend of male students rating professors generally lower, regardless of gender, compared to female students. Implications and ideas for future research were also discussed.

Relationship Between Religiosity, Paranormal Belief, and Conspiracy Theory Beliefs (Poster: Table 11)

Presenting Student: Sophia Griffith
Faculty Mentor: Dr. D. Alan Bensley

Psychological studies of beliefs have found that peoples' ratings of religiosity have been positively correlated with belief in unsubstantiated conspiracy theories and with belief in the paranormal. However, these studies have sometimes obtained contradictory results and have often not investigated the relationships among belief measures using multidimensional measures of religiosity. To further our understanding of the interrelationships of these beliefs, this study used a more comprehensive measure of religiosity, the Centrality of Religiosity Scale (Huber, 2012). In particular, we examined the scale's five dimensions of religiosity (public practice, private practice, religious experience, ideology, and intellect) in relation to conspiracy theory belief and paranormal belief. In addition to the Centrality of Religion Scale, we administered the Revised Paranormal Belief Scale of Tobacyk (2004), and the Specific Conspiracist Belief Inventory of Bensley et al. (2020) to college students in introductory psychology. Statistical analyses focused on the inter-correlations among the measures of the three types of belief.

The Better-Than-Average Effect with Critical Thinking Dispositions: Replication and Elaboration (Poster: Table 11)

Presenting Students: John Liparini, Daniel Palus, Kaylee Pifer, Kendra Harpold, Sophia Griffith
Faculty Mentors: Dr. D. Alan Bensley, Dr. Kathleen Jocoy

Psychologists have repeatedly found that individuals rate themselves higher than they rate their average peers on numerous dimensions, showing the better-than-average-effect. In particular, people often show the better-than-average-effect with ratings of socially desirable or positive traits. For example, research has shown that people rated themselves as more tolerant, honest, interesting, and intelligent than they rated their average peer on the same trait. Critical thinking dispositions, such as open-mindedness and fair-mindedness, are socially desirable traits and, therefore, ratings of them might also be expected to exhibit the better-than-average-effect. To test this, we asked 399 general psychology students to rate themselves and to rate the average student in their class on open-mindedness and fair-mindedness and extended our study of such ratings to include scientific skepticism. We also expected that for ratings of close-mindedness, susceptibility to bias, and gullibility, negative dispositions corresponding to the three respective positive dispositions, students would rate themselves as less close-minded, less susceptible to bias, and less gullible than the average student in their class. We found that participants rated themselves more open-minded and correspondingly less close-minded, more fair-minded and correspondingly, less susceptible to bias than the average student. Although they rated themselves as less gullible, they did not rate themselves as more scientifically skeptical than the average student. We discuss why the better-than-average-effect did not emerge for scientific skepticism but did occur for positive critical thinking dispositions but why the ratings on all three corresponding, negative dispositions were in the predicted direction.

SOCIOLOGY DEPARTMENT

“Baddies”- The New Depiction of Minority Women (Poster: Table 17)

Presenting Student: Rosee Maire Wyman
Faculty Mentor: Dr. Angela Luvara

"Baddies" is a reality TV series spin off of the Oxygen show “Bad Girls Club” created by social media influencer Natalie Nunn and produced by the Zeus Network. Natalie Nun was a former cast member on the show “Bad Girls Club” appearing on seasons four and thirteen as well as the shows other spins offs such as “Love Games: Bad Girls Need Love Too” and “Bad Girls All-Star Battle.” Set in multiple different shared houses, the series captures the dynamics among these female influencers who are known for their strong personalities and occasionally violent tempers. It offers viewers an inside look at the highs and lows experienced by the cast while they embark on road trips across the country. The show "Baddies" provides a glimpse into the intense and often chaotic lives of its cast members while presenting a raw portrayal of the pressures of being an influencer in a reality TV setting. Analyzing a TV show such as "Baddies" becomes not only relevant but essential, as it presents the opportunity to critically examine how minority women are portrayed in mainstream mass media. Growing up in a community where I have personally witnessed the harmful and negative impact that mass media stereotypes inflict on individuals' and their perceptions of themselves as well as their communities, examining the themes of the show allows me to explore how these representations contribute to broader societal attitudes and biases. The perpetuation of negative stereotypes regarding minority women in "Baddies" holds significant implications for how society views mass media and pop culture. By depicting women from marginalized backgrounds as overly aggressive, confrontational, or hypersexualized, the show not only reinforces harmful stereotypes but also reinforces existing power dynamics and inequalities. On a broader sociological level, "Baddies" perpetuates harmful stereotypes, particularly at the expense of minority women. The portrayal of these women as "baddies" reinforces negative stereotypes about their behavior, attitudes, and character as well as sets unrealistically high standards for their physical appearance on and off screen. Through its portrayal of minority women as confrontational and rebellious "Baddies," promotes and perpetuates harmful stereotypes, contributing to the marginalization and objectification of minority communities, which warrants a closer examination of its impact on broader sociological dynamics. Through my analysis, I will shed light on the ways in which these portrayals contribute to the marginalization and dehumanization of minority women. By interrogating the underlying messages and narratives within "Baddies," I want to contribute to a broader conversation about media representation and the importance of diverse portrayals of women of color in popular culture as well as examine the ways in which the show perpetuates these stereotypes and the broader implications for its cast members, viewers and society.

Everybody Hates Chris: A Moral and Ethical Analysis of Chris Brown (Oral Presentation: Room 111 from 12:30-1:00)

Presenting Student: Chandler Nelson
Faculty Mentor: Dr. Angela Luvara

I don't like Chris Brown and you shouldn't either. In a perfect world, that would be enough and I wouldn't have to write a whole paper and presentation proving my point but unfortunately that's exactly what I've done. Since the beginning of his career until now Chris Brown has been abusing women in some way, shape or form. He has multiple allegations of various types of misconduct or abuse and several restraining orders to prove it. The one thing he doesn't have? The rap sheet to prove it. None of Brown's victims (sans Rihanna and Karrueche Tran) have taken him on in criminal court. They've relied on the court of public opinion in hopes that telling their stories would help put an end to his tyranny, the latter has happened. Chris Brown has evaded the consequences of his actions for too long while his victims have had to rebuild their lives while simultaneously watching his rise to fame with his fan base being the very community he preys on, Black women. Many people would be inclined to ask themselves why victims of abuse from someone of such notoriety wouldn't trust our country's legal system. I am not one of those people. Our legal system is not built for the nuances that come with abuse. It is only built to answer yes or no questions, never yes, and. To rely on this same system to provide any sort of solace would be a mistake that many victims aren't willing to make because they know better. Much bigger than that, our legal system was systemically built to incarcerate Black men, making them cogs in a racist machine of violence and corruption. Black women have seen this and have often shied away from reporting their abuse due to not wanting to perpetuate this system of carceral violence, even if it is to their own detriment. This presentation serves as an explanation for how men like Chris Brown a part of a much bigger issue of repeated violence with little to no consequence are. In a world where white supremacy has created systems of bondage for Black men and women and their stereotypes. It will highlight how we as a society and as a [black] community can and should hold Black men accountable, without casting a net that all Black men are violent, nor are they deserving of treatment they receive both in and out the legal system. One bad apple does not spoil the tree in this case, I would even argue that all you have to do is cut off the bad apple and the tree can grow taller. I personally would throw said apple away but that's just me.

Lights, Camera, Action: Uncovering Misrepresentation & Controlling Images in Tyler Perry Films (Poster: Table 17)

Presenting Student: Tiffanie Richardson
Faculty Mentor: Dr. Angela Luvara

Exploitation of black pain is a mechanism often used when portraying the image of how Black men and women interact with one another and the world around them, when oppression is inspired. The present study will analyze the content of controlling images and stereotypical traits exposed in

specific Tyler Perry films and identify the ways that Black pain, specifically involving Black women, is produced as pleasure, within these portrayed roles and representations. Tyler Perry strengthens his films and moves the audience away from the main motif by utilizing a combination of harmful tropes into the Black experience, while representing aspects of Black culture. Depictions of trauma, abuse, anger, neglect, and bitterness are sampled for films regarding Black women in "For Colored Girls", "Diary of a Mad Black Woman", and "Acrimony". Pain and agony are being positioned underneath the stereotypical maintenance of controlling Black women, in hopes of putting on a public display to punish them and accentuating things that they have already gone through. Additionally, there is illegitimacy surrounding the image of the Black woman and the belief is held that these stories are achieving something good, while catering to the status quo.

The Legacies of the Carceral State: Policing and the Power of Resistance (Oral Presentation: Room 111 from 12:00-12:30)

Presenting Student: Callie Miller
Faculty Mentor: Dr. Angela Luvara

From the beginnings of chattel slavery to present day mass incarceration and police brutality, the United States has worked to control and police Black bodies. There's a common misconception that slavery is an issue of the past and that the United States should just move on. The issue with that assertion is that the legacies of slavery and slave patrols are still persistent today. Systemic racism is still very much relevant and harmful. The abolishment of slavery was not the end of white supremacy or institutional racism. This presentation outlines the evolution of the system of white supremacy and policing as well as the consistent resistance to it. Today, Stop Cop City is working to resist police brutality by protesting and trying to prevent the construction of Cop City in Atlanta. The organization is an example of the present-day resistance to increasing surveillance, criminalization, and police brutality in predominantly Black communities.

Transgender Athletes' Right to Sport (Poster: Table 17)

Presenting Student: Lydia Nebiolo
Faculty Mentor: Dr. Angela Luvara

Transgender athletes have faced persecution and hate from not just society, but from teammates, coaches, and noted athletic organizations. Lia Thomas, a former swimmer from the University of Pennsylvania, faced extraordinary hate from other swimmers and especially other athletes who felt that her transition gave her an unfair advantage in her sport. As a female athlete in the same sport, watching Thomas get discriminated against is completely unfair. I found teammates sharing hurtful messages and posts about the hate she was experiencing, agreeing with the hatred, and it greatly upset me. In a former class, we were given the option to do a research paper on any topic, and I selected the history of Title IX because I wanted to see what the legislation offered in terms of

transgender and queer athletes. After doing extensive research on the Title IX legislation, I found that the wording of the legislation does not prohibit transgender or queer athletes from participating in athletics, and I find it disheartening when people accuse those who are transgender of having an unfair advantage. I performed other research through online selections and the NCAA, as well as learned more through a national organization called Athlete Ally. Athlete Ally provides educational programs for students, faculty, and athletic departments as a whole to help them understand obstacles that queer and transgender student-athletes face, as well as how to best support them on their campus. The founder, who was a wrestler at University of Maryland, started this organization because of the discrimination he found in wrestling, a male dominated and where trash talk consists of sexist and homophobic slurs. The organization holds trainings, as well as partnering with major organizations such as the NBA, NCAA, and the MLB as well as major sport teams. I selected this topic because as a queer female athlete, it is important to have representation and acknowledgement of those who came before me, as well as to educate people on why it is important for transgender athletes to have a right to sport. If more people learn about the legality of transgender athletes competing in sports, they will see that they do not receive an unfair advantage, they receive the same treatment and opportunity as everyone else. Like it or not, queer and transgender athletes are competing in athletics, and just as much as one athlete has the right to sport, so do they.

VISUAL ARTS DEPARTMENT

Creating a Graphic Novel (Physical Display: Table 5)

Presenting Student: Hana Nazelrod
Faculty Mentor: Mr. Jamison Odone

“My Roommate Yoshiko" delves into the intricate lives of a group of college girls in Washington DC, centering around Ayana, whose world is turned upside down when she discovers her roommate isn't quite who she appears to be. Through vivid storytelling and compelling visuals, the graphic novel explores themes of friendship, familial struggles, and resilience in the face of adversity. The graphic novel showcases the beauty of camaraderie amidst adversity, portraying the strength and support found in true friendships. Ayana's journey is not only a quest for understanding her roommate but also a reflection of her own inner struggles and growth. Through her interactions with Yoshiko and her friends, Ayana confronts the complexities of her own family relationships and learns valuable lessons about acceptance and forgiveness. The creation process of "My Roommate Yoshiko" is a meticulous journey. From the initial stages of writing and sketching to the final steps of inking, coloring, and editing, each phase is a labor of love aimed at bringing the characters and their world to life. Throughout my presentation, my viewers will be able to see the process of creating this book: writing, sketching, inking, coloring, and then editing.

WOMEN'S STUDIES PROGRAM

Gender and Tropes in Romance-Fantasy Webtoons (Oral Presentation: Room 111 from 1:00-1:30)

Presenting Student: Sydney Smolenski
Faculty Mentor: Dr. Angela Luvara

Media has always played a role in shaping and reinforcing social standards within their specific genres. Webtoon is a service offering free access to hundreds of comics in a wide range of genres. One of the most popular types is their romance genre, with many adaptations of Korean Manhwa. While not every fantasy-romance Webtoon is, they are some of the most infamous from the site and often highly ranked in polls. These stories also reuse and recycle the same harmful tropes found in the genre. Even worse is when they try to make commentary on them, the narrative instead pushes forward with the trope. I've selected a sample of some of Webtoon's fantasy-romances to dissect these tropes, how they're harmful, and how they perpetuate gender stereotypes while showing an example of commentary.

The Effects of Machismo in Latin America and How to Combat it (Oral Presentation: Room 111 from 11:30-12:00)

Presenting Student: Hailie Toro
Faculty Mentor: Dr. Angela Luvara

Machismo is a concept that has been the forefront of many Latin American issues in the past few decades, such as increased rates of domestic violence, rape, and femicide, with femicide being a type of homicide that is motivated by gender discrimination. Machismo often has a negative connotation in the Latin American community, regarded as meaning a heightened sense of masculinity and a belief of superiority over women. It has become of increasing concern to address this issue, considering the heightened rates of gender-based violence in Latin America. Social work, with subsects like community organization, social justice advocacy, social justice work, and race work, can allow for the targeting of machismo in Latin American communities. By beginning to understand the intricate relationship Latin American people have with machismo, social workers can begin assisting clients and communities in more effective ways. Using aspects of social work such as community organization, social justice work, social justice advocacy, and race work, issues such as gender-based violence, social inequalities, and economic inequalities can be addressed. This presentation will be focused on the origin of machismo, negative effects of such, and the tools we can utilize to address sexism in Latin America. It is focused for non-Latin American folks to become more educated on Latin American issues.

COLLEGE OF BUSINESS, ENGINEERING, AND COMPUTATIONAL & MATHEMATICAL SCIENCES

COMPUTER SCIENCE & INFORMATION TECHNOLOGIES DEPARTMENT

Autonomous Line Following Robot (Poster: Table 24)

Presenting Student: Courage Tikum
Contributing Students: Lucian Rectanus, Jonathan Eanes, Melvin Weeks, Khalil Charles, Elijah Mendez
Faculty Mentor: Dr. Nooh A. Bany Muhammad

Today, society is home to a rapidly evolving technological landscape, in which robotics has emerged as a transcending element in transforming the present and shaping the future. Robotics plays a role in many fields, including but not limited to healthcare, agriculture, the food industry, manufacturing, and even in our own homes. As automation becomes more prevalent, the progression of robotics becomes more relevant, making once-difficult tasks easy and creating possible solutions for things that were previously impossible and unsafe for humans. At the Spark Innovation Lab here at Frostburg State University, our members strive to assemble fun and creative projects that provide practical experience in the tech field. One such aspect our lab focuses on is the engineering of robotics projects and gadgets. Most recently, we constructed an Autonomous Line Following Robot. The main motivation for this project was to learn and create something practical and fun while laying the foundation for future projects our lab has in store. Our team, while primarily filled with tech majors, hopes to use projects like this to expand the diversity of our members, by incorporating multiple aspects into our design and overall vision. From graphical design to engineering and coding, our Autonomous Line Following Robot was a collective effort that required multiple fields of knowledge to be put together. The robot, powered by batteries, moves along a surface through the use of motors and incorporates two light sensors to gauge the path of travel. Once the robot's light sensors come into contact with a certain surface, in our case we used black tape, the light from an LED connected to the bot reflects off of the tape into the sensor causing the robot to rotate away from the surface and realign itself to stay on the correct path. This project took our lab approximately one month to create, from planning, designing, 3d printing parts, coding movement, wiring, and much more. We hope the project serves as a starting point for greater and more exceptional projects in the future.

Do You Know Denial of Service (DDoS) (Poster: Table 23)

Presenting Students: Melvin Lopez Diaz, KeMarsh Matthews
Faculty Mentor: Dr. Wenjuan (Wendy) Xu

DOS Attack Case Study

Denial of Service (DoS) is a type of cyber-attack that aims to make a computer system, network, or website unavailable to its intended users by overwhelming it with traffic or requests. The history of Denial of Service attacks can be traced back to the early days of computer networking and the internet. **Early Developments:** The concept of Denial of Service attacks emerged in the late 1980s and early 1990s as computer networks became more widespread. One of the earliest documented DoS attacks was the "Internet Worm" released by Robert Tappan Morris in 1988, which inadvertently caused widespread disruptions by rapidly replicating itself across the internet. The use of Denial of Service attacks is generally considered malicious and illegal, as they can cause significant disruptions, financial losses, and damage to businesses and organizations. However, DoS and DDoS attacks are sometimes used by security researchers and ethical hackers to test and evaluate the resilience of systems and networks, with the permission of the owners. While the primary purpose of DoS and DDoS attacks is to cause disruption and denial of service, they can also be used as a diversionary tactic or as a means to extort money from victims through ransomware or other threats. Additionally, some attackers may use DoS attacks as a smoke screen to conceal other malicious activities, such as data theft or network intrusion. It's important to note that Denial of Service attacks are illegal in most jurisdictions, and their use can result in severe legal consequences. Organizations and individuals must implement appropriate security measures, such as firewalls, intrusion detection systems, and DDoS mitigation strategies, to protect against these types of attacks.

Examples:

- DDoS attacks on Amazon's AWS cloud computing in 2020.
- GitHub attack in 2018.
- Cloudflare attack in 2014.

These examples showcase the significant impact that DDoS attacks can have on the world. They can shut down important businesses, costing the company significant amounts of money. For instance, in the case of Amazon's cloud computing, if people cannot access the cloud, they cannot access any of the saved files. These attacks also keep a company out of business for varying lengths of time, sometimes taking hours or even days, resulting in substantial loss of profits.

Preventative Measures:

- Reduce the Attack Surface Area.
- Know what normal and abnormal traffic is.
- Deploy Firewalls for Sophisticated Application attacks.

While we wish we could stop DDoS attacks completely, we cannot. Only if we disconnect from the internet can we be safe from any attack, but in today's world, the internet is too important for that to be a viable solution. Nevertheless, in the constant battle between hackers and online security, there are measures that can be taken to make it more difficult for someone to launch a DDoS attack on a network. A simple method is to monitor the amount of traffic your network is receiving. If there is a sudden drastic increase, this could indicate a DDoS attack is occurring.

Enhanced eBook Reading Experience: A Java-Based ePub Reader (Poster: Table 23; Oral Presentation: Room 108 from 12:00-12:30)

Presenting Students: Jaydason Miller, Christian Pross, Austin Comeaux, Adetola Adekanmi
Faculty Mentor: Mr. Steve Kennedy

In an era of digitization, our team presents a Java program designed to advance the reading experience in a technological favor. At the beginning of the school year, students often will find textbooks online from many different sources in order to save cost. It can become a hassle having to go to 3-5 different sites to read your textbooks. Our program showcases the benefits of having a singular access point for all digital textbooks. Leveraging the capabilities of the epub library, our project aims to provide seamless access to digital books, enhancing both accessibility and enjoyment for readers, particularly those in the education domain. Research shows the growing preference for eBooks for those who enjoy reading, citing their affordability, practicality, and unique advantages over physical copies. Statistically, eBooks are approximately 22% more cost-effective, offering easy sharing capabilities and catering to diverse reader preferences. Adjustable fonts and sizes ensure inclusivity, benefiting both college students and the elderly, while the compact nature of eBooks makes them ideal for those with limited storage space. Moreover, the durability of eBooks surpasses that of physical books, mitigating concerns of degradation and damage. Our Java-based eBook reader, developed in Eclipse IDE, utilizes the epub library to download and display digital books seamlessly. Integrated with Window Builder, the program emulates the user experience of popular e-readers, such as Kindle, enhancing readability and accessibility. Through our project, we provide a vision of centralized access to school textbooks from different web sources, offering students a convenient and efficient way to manage their educational materials while maintaining the cost-effective approach.

Flood Detection System (Poster: Table 6)

Presenting Student: Brandon Maraj
Faculty Mentor: Ms. Mian Qian

During the rainy season, some regions such as Cumberland are more likely to experience flooding threats. A properly designed Flood Warning System generates critical information that can minimize property damage and loss of life. Our smart real-time flood warning systems enable a faster, more efficient, and more predictable response. We used a microcontroller ESP8266 and an ultrasonic sensor to get water depth data, then used the application Blynk installed in the smartphone to inform users. Once water hits the predefined danger line, an alert will be sent to the user's smartphone and email to call for immediate attention.

Mining and Predicting Player Stats in Sports (Poster: Table 23)

Presenting Students: Nicholas Hands, Riley Martin
Faculty Mentor: Dr. Chung-Chi (Edwin) Huang

Sports analytics revolutionizes how we understand sporting events and provides an edge to a team or individual. In this paper, we propose a framework that collects player stats on the fry from ESPN and predicts future performance. Specifically, we scrape player bio and player stats through ESPN API based on user's request. The collected historical player stats will then be used to predict athletic performance in future games. We plan to explore and compare the effectiveness of different machine learning techniques such as regression models and support vector machines, and we believe recent games offer better insight than those dated far back in time. As for future work, we will investigate the impact of news from news outlets or posts in social media on the prediction.

Raspberry Pi - Temperature Controlled DC Fan (Poster: Table 12)

Presenting Students: Nicholas Hanes, Rahsaan Simpson, Terence Liley, Ricardo Coleman, Jr.
Faculty Mentor: Dr. Ying (Joy) Zheng

Our project is to dive deeper into the computer and programming involving in home / everyday automation. The raspberry pi that we use can control entire households and be used for many different applications. Our goal was to learn how to work with raspberry pi's while creating a functional product that can be useful in everyday life. The use that we chose to work on is a fan that automatically turns on when the environment reaches a certain temperature. We did this by programming a "threshold" for the sensor that the raspberry pi looks out for and automatically powers a DC fan. This idea could be used in a PC to automatically turn on a CPU fan or even in your household to automatically turn on a ceiling / box fan to regulate temperature.

RPG-Style A.I. Mental Health Coach (Poster: Table 18)

Presenting Student: Robin Abayomi
Faculty Mentor: Dr. Xunyu Pan

The project presented is a mental health-oriented chatbot, its main functionality implemented using the ChatGPT API and selective fine-tuning to enhance its pre-defined behavior and role. The theme of the project closely follows retro-style graphics, heavily inspired by RPG-style video games (i.e. Final Fantasy, Pokémon), etc. The chatbot can provide appropriate and relevant advice to the user, though it should be made as a disclaimer that the chatbot is not intended to fulfill the role of a traditional therapist. It can, however, mimic some of the key-behaviors and techniques a therapist may normally employ, specified in its system behavior and additional fine-tuning. The chatbot also has the functionality of behaving differently through three distinct personalities, selected by the

user prior to initializing the chat. The primary goal behind this project is to allow users to further understand the depth behind some issues they may be experiencing, utilizing the chatbot as a healthy outlet and source of insight.

Smart Home (Poster: Table 6)

Presenting Students: Matthew Murphy, Connor Riley, Rodney Shearin
Faculty Mentor: Ms. Mian Qian

A smart home means you can remotely control your appliances and add automated tasks for your comfortable space. You can use a smart home system to set and monitor your home security system and cameras, or even control appliances like your refrigerator or air conditioning and heating. In our smart home project, we used a sensor to get real-time humidity and temperature information, which will be monitored through our smartphone. We also created a mini music DJ station, which can be controlled by our smartphone as well.

Smart Parking System (Poster: Table 6)

Presenting Student: Cody Blankenship
Faculty Mentor: Ms. Mian Qian

Smart parking solutions detect parking space availability in real time, helping to optimize on-street parking in our surface parking lot. Our smart parking solution uses a microcontroller ESP8266 with low-cost sensors, which has an overall cost of less than $20.00. We want to demonstrate how our smart parking system works and the benefits of using a smart parking system on our campus.

Sound Visualization System using Raspberry Pi and Touch Screen Interface (Poster: Table 12)

Presenting Students: Owen Keller, Nathan Schoffstall, Johnathan Sheikh, Jonathan Smilek, Matthew Zingeser
Faculty Mentor: Dr. Ying (Joy) Zheng

In this project, we propose the development of an Interactive Sound Visualization System leveraging the capabilities of Raspberry Pi, a sound sensor, and a 5-inch HDMI touch screen. The system aims to provide users with an immersive and engaging experience by translating sound inputs into visually captivating displays on the touch screen interface. The Raspberry Pi, running on Raspbian OS, serves as the central processing unit, orchestrating the integration of audio input from the sound sensor and rendering the corresponding visualizations. The sound sensor detects ambient audio signals,

which are then processed and analyzed in real-time using algorithms implemented on the Raspberry Pi platform. The output of the analysis is visualized on the 5-inch HDMI touch screen, and a hosted website offering users an intuitive and interactive interface to explore soundscapes through dynamic graphical representations. Key features of the system include real-time audio processing, audio visualization, and user-friendly touch screen controls. Applications of the Interactive Sound Visualization System span various domains, including education, entertainment, and interactive art installations. It offers a novel and accessible way to engage with sound and explore its visual manifestations in real-time. Through this project, we aim to demonstrate the potential of Raspberry Pi as a versatile platform for audiovisual experimentation and interactive multimedia experiences. The system not only showcases the capabilities of affordable hardware components but also fosters creativity and exploration in the realm of digital audiovisual art and interactive technology.

The Application of Image Analysis Using Large Language Models for Robot Navigation (Poster: Table 18)

Presenting Student: Jeremy Perando
Faculty Mentor: Dr. Xunyu Pan

For this project I will make a simple robot with a mounted camera that uses the ChatGPT API to analyze images from the camera and respond accordingly. The goal is to have a robot that can see multiple objects, then go to the correct one when told. For example, if there is an apple and an orange in front of the robot, the robot could be told “go to the orange” and it would analyze the image with ChatGPT to find the position of the orange. It could then feed the location of the orange to ChatGPT again to get code instructions to travel to the orange. The robot will be built using a Raspberry Pi and will make use of the ChatGPT 4 API for image analysis and dynamic code generation. ROS, the Robotic Operating System, will be used to control the robot and get images from the camera. The robot will be programed using Python since both ROS and ChatGPT have Python libraries available.

Utilizing Raspberry Pi for Live Temperature Monitoring (Poster: Table 12)

Presenting Students: Alex Dignan, Aley Sary, Eric Kilpatrick, Gavin Russell, Stephen Osunkunle
Faculty Mentor: Dr. Ying (Joy) Zheng

In this project, we investigate the Raspberry Pi's capabilities for temperature sensing. The cost-effectiveness and impressive computational power of Raspberry Pi boards provide a solid base for exploring temperature and general environment sensing while providing room to grow. The Raspberry Pi senses various attributes of its surroundings using a Raspberry Pi Sense Hat. This chip not only provides a way to read the temperature near the device, but its additional sensors also allow for further expansion in scope for the project in the future. More specifically, the Sense Hat comes with sensors for color, pressure, and acceleration among other sensors as well as an 8 by 8

grid of LEDs built into the board which offers opportunities for incorporating various sensory data into future project iterations. Our project demonstrates Raspberry Pi's effectiveness in environmental monitoring, making it a versatile tool for a variety of applications. The modular nature of the board also enables the exploration of additional purposes and opportunities in the future. In conclusion, our project illustrates the versatile nature of Raspberry Pi as a tool for environmental sensing and monitoring. The modular nature of the Raspberry Pi opens the door to further innovations in environment sensing and monitoring.

Wedding Planner AI (Poster: Table 18)

Presenting Student: Kaitlyn Custer
Faculty Mentor: Dr. Xunyu Pan

The project is called "Wedding Planner AI". The goal is to create a website/application that helps individuals plan a wedding. The motivations are an interest in OpenAI's API for ChatGPT and planning my own wedding. The goals of this project are to reduce stress in the lives of people planning weddings, gain knowledge in training an AI, and to get personalized suggestions. The website/application was created using React and calls the OpenAI API. The code is written in multiple languages (Javascript/HTML/CSS), using Visual Studio Code, and saved on GitHub. Features of the Wedding Planner are: guest lists, vendor suggestions, budget management, scheduling, to do lists, reminders, and theme suggestions. The first goal is to make a basic chat function like ChatGPT (including image generation) and an information dashboard. The second goal is to make the AI and user able to edit the dashboard. The final goal is to make the AI able to learn from the conversations and the dashboard.

ECONOMICS DEPARTMENT

Costs and Benefits of Solar PV Installation on FSU Campus (Poster: Table 10)

Presenting Student: Alexander Marquis
Faculty Mentor: Dr. Oleg Kucher

This paper presents a cost-benefit analysis of a projected installation of solar photovoltaic (PV) panels on a certain campus building at Frostburg State University. Frostburg State University is spending an exponentially increasing cost on electricity. From student dormitory buildings to educational campus buildings, the university is inefficiently allocating its electricity spending that could be used elsewhere on campus. Using a combination of economic modeling techniques, we evaluate the feasibility and potential returns of implementing solar PV panels on a campus facility. Our analysis considers factors such as initial capital investment, operational costs, maintenance expenses, available incentives, and projected energy savings over the solar PV system's lifespan. Our findings indicate that while the initial investment may be significant, the long-term benefits of transitioning to solar energy outweigh the costs.

Ideology or Economics: An Examination of State Wage Determinants (Poster: Table 10)

Presenting Student: Kolby Hendricks
Faculty Mentor: Dr. Suzanne McCoskey

The common sentiment is that a state's wage policy, specifically whether a state has accepted the federal minimum wage or a higher state-set wage, is almost entirely based on the political affiliation of the state. This idea has been enough to inform movements and individual voters to petition for or against candidates entirely based on political alignment. There has not been much research in the way of challenging that view; this paper seeks to ask the question as to whether that sentiment is accurate. The results of this research, to the contrary, suggest that, in fact, state political affiliation measured by governor political party is of marginal significance and is overestimated in discussions of wage policy. This research has found that state union membership, employment in low-skill fields, as well as median age and per capita spending habits, are holding more significance than previously assumed. In fact, the impact of certain variables is different than might be expected as to their effect on a state's decision. Specifically, one would assume that an older state is more likely to be resistant to change and therefore be more in favor of a wage at the federal level; this study found that as a state ages, they are more likely to have a wage set above that of the federal level. One would also assume that if a state has more employment or spending within sectors that would be reliant on the minimum wage, they would be more likely to have a higher wage; the findings of this research contradict that assumption by finding that as both spending within minimum wage or low-skill sectors and the proportion of employment within those sectors more than the national average

increase, they are more likely to have a minimum wage set at the federal level. In summary, the previous notion that politics stand the main driving factor behind minimum wage policy at the state should be held in question. Not only this but previous sentiments should also be held to scrutiny as they may be outdated or unfounded. Most importantly, when discussing minimum wage more significance should be assigned to the fundamental economic realities of an area when considering how, when, or even why change may be necessary.

The Factors That Influence Cancer Rate Per Capita in the United States (Poster: Table 10)

Presenting Student: A'nya Randall
Faculty Mentor: Dr. Suzanne McCoskey

For my research, I will be examining if access to health care has an impact on the sickness rate per capita in the United States. My primary focus for this research will be the correlation between healthcare access and how this affects low-income communities, while obtaining supporting evidence and literature from the resource and energy field of economics. My dependent variable will be access to health care where I will consider the following variables: state income, state employment, state sickness per capita, average age per state, water quality per state, in addition to medical doctors per capita. The data for this topic will be measured at a state level. I will create a panel data set of the 4 regions in the U.S. over a span of 3 years (2020-2023). My data will come from the Organization for Economic Co-Operation and Development (OECD), https://stats.oecd.org/index.aspx, in addition to United States Census Bureau, https://data.census.gov/. When conducting this research, I expect individuals who do not have access to health care to have a higher level of sickness per capita than others, as this might influence the data.

ENGINEERING DEPARTMENT

3KW Modular Solar Generator (Poster: Table 19)

Presenting Students: Wilmer Ramirez, Eric Lemus
Contributing Student: Joseph W. Johnson
Faculty Mentor: Dr. Tariq Masood

The popularization of portable battery banks that can be charged by solar panels, known as solar generators, has been growing in popularity with recreational and off-grid communities. Most entry-level solar generators are around $200–300 and offer around 250 Wh of energy. These generators are enough to power small appliances for about an hour or two before needing to be recharged. The battery bank we have developed will be 10x as powerful and a fraction of the cost of leading solar generators. The battery bank we built has an internal capacity of 2496Wh (52V * 48A), can be powered by both solar and a household outlet, is easy to transport, and is completely repair friendly. The most important part of this build was that we used 100% recycled battery cells to build it at a fraction of the cost that a company-made one would have. The cells are made of lithium-ion recovered from e-bike batteries. 168 cells were used to make the battery bank. A BMS is used to monitor and charge the batteries to prevent overcharging or discharging and allows monitoring of the battery through Bluetooth. The solar charge controller is a Victron 100V; this also limits overcharging of the battery and allows the use of solar panels to charge the battery bank up to a maximum rate of 1200W (60V * 20A). A 3000W (120V * 25A) inverter is then used to convert the 52V DC to 120V AC with a stable 60Hz true sign wave. This is important for sensitive equipment, such as medical devices. Due to working with high current and voltages, several safety operations are in place, such as emergency battery disconnects, fuses, and smart sensors throughout the build. The main goal of this project was to showcase how easily it is to build your own energy storage, the importance of being able to reuse otherwise thrown-away lithium cells, and the ability to build upon and expand the system due to being able to easily swap out parts compared to commercial products.

EZ Reach ATM (Poster: Table 22)

Presenting Students: James Dean III, Joseph Frye II, Christian Speir, Sydney Theobald, Christopher Thomas
Faculty Mentor: Dr. Jamil Abdo

This project proposes a new design for drive through Automated Teller Machines (ATM) that is capable of adjusting to the height of each vehicle that attempts to operate the ATM. Traditional ATMs are designed with a fixed height. This fixed height is often the cause of inconvenience to the user. This inconvenience is prevalent to users in various vehicles, such as low-rise cars, and high-rise trucks. Our innovative solution integrates both sensors and motors to adjust the height of the machine based on the height of the user's vehicle. This ensures that the user experiences optimal

accessibility and experience. Included in the optimal accessibility is time saving and safety. The user can operate the ATM from the inside of their vehicle, this saves time and is safer. The user would not have to lean out their vehicle's window or get out of their vehicle.

Improving Drone Durability with 3D printed Propellers and Guard Rails Design (Poster: Table 21)

Presenting Students: Elizabeth Betts, Daniel Mitzel, Furkan Ozdemir
Faculty and Staff Mentors: Dr. Kaimiao Liu, Mr. John Murphy, Ms. Kayla Ross, Mr. Christopher Thomas, Mr. Randy S. Ferrin

The purpose of this project is to explore whether basic 3D printed additions can enhance the quality of affordable drones. This involves optimizing propeller design, adding guards to each propeller and utilizing better materials. Many drones available in the market encounter issues with their propeller durability and wind resistance. The project explored propeller shape and design, carbon fiber reinforced printing, and utilizing Solidworks propeller and guard design. Key focus areas include enhancing durability factors such as toughness, tensile strength, bending modulus of elasticity, and impact strength were investigated. Implementing 3D-printed additions and new material shows potential to enhance the durability and wind resistance of these drones, supported by assessments including uniaxial tensile testing, Charpy testing, 3-point bend testing, wind tunnel testing, and field tests conducted with new propellers and guard rails on the drones.

Sun-Tracking Solar-Powered DC Water Pump (Poster: Table 20)

Presenting Students: Daniel Foster, Edem Hotor, Dylan Viola, Isaac Zais
Faculty Mentor: Dr. Tariq Masood

In some parts of industry, electric power needs to be supplied to devices in remote areas. A popular approach to this issue for low-power devices is to install solar panels. There are many factors that can limit the power output of a solar panel, including the positioning of the panel in reference to the sun. To overcome this problem, we propose an affordable, compact solar panel mount that can monitor the position of the sun and change the angle of the panel accordingly. In our application, the solar panel powers a water pump, demonstrating the ability to perform remote irrigation for agricultural purposes. The energy captured from the panel is stored in a battery, and the battery powers the water pump, along with a controller that controls the logic of the light sensors and the motion of the actuator that tilts the panel.

MANAGEMENT DEPARTMENT

Do We Need Feminism in the Workplace or Have We Achieved Equal Opportunity? (Poster: Table 4)

Presenting Student: Shannon Casey
Contributing Students: Thaddeus Deremer, Sebastian Ghase, Kwame Nketia
Faculty Mentor: Dr. Rebecca M. Chory

The purpose to our study is to discover college students' feelings on whether or not feminist mindsets and initiatives are required in the workplace for modern day working women to have a successful career in a cohesive environment. We will accomplish this by surveying college students both in person and online through Google surveys posted on social media platforms. We will ask a series of questions in the survey to gather what feminism means to college students and their opinions on the matter. We will present this data by creating a graph of responses to the main question, "Do we need feminism in the workplace, or have we achieved equal opportunity?" and supplement the research with contextual background questions. This, paired with our research on feminism and the workplace, will help us to conclude whether or not feminism is required in the workplace in the modern day.

Hidden Disabilities in the Workplace (Oral Presentation: Room 108 from 11:30-12:00)

Presenting Students: Eric Denham, Shannon Casey, Teresa Wolf, Nakya Pack
Faculty Mentor: Dr. Kenneth Levitt

The purpose of our presentation "Hidden disabilities in the workplace" is to explore the topic of HR policies and workplace culture surrounding nonvisual disabilities such as mental health conditions or chronic conditions that may impact employee performance. We aim to promote the benefits of workplaces adopting a culture in which open conversations around hidden disabilities occur, as well as encourage inclusive HR policies beyond what is covered by the Americans with Disabilities Act. We will supplement this claim with expensive research surrounding this topic including the benefits of organizations awareness of hidden disabilities.

Scripts and Stereotypes: Analyzing Workplace Dynamics on Screen (Poster: Table 4)

Presenting Students: Jenna Keller, Teresa Wolf, Eric Denham
Faculty Mentor: Dr. Rebecca M. Chory

Movies are a creative reflection of the society in which they are made, so we examined six contemporary movies across three different genres to see if men and women are portrayed in stereotypical gender roles within the workplace. We wanted to see if women took on a supporting role in comparison to their male coworkers, and if men were shown in any ways other than the typical dominant businessman. We used critical analysis of character appearances, interactions, and status to find potential trends. Our study aims to raise awareness of how gender stereotypes and biases in society are reinforced through media.

The Power of Beauty: How Physical Attractiveness Can Impact Careers in Organizations (Poster: Table 4)

Presenting Student: Fatoumata Bah
Contributing Students: Caleb W. Garner, Haniebal Gebrie, A'nya G. Randall
Faculty Mentor: Dr. Rebecca M. Chory

Since time immemorial, every worker has at least pondered the question: Was I chosen for my appearance? Or, conversely, was I not chosen because of my appearance? It's a delicate subject that needs to be understood and will provide future generations with an answer to this kind of question. It's true that some people may be hired for a job because they are physically attractive or may receive a promotion within the company without it necessarily being based on merit. So, if being attractive means getting the job you want, what about others? What about people who don't meet society's beauty standards, who are sidelined because of their appearance without necessarily considering what lies within or their skills? Being beautiful doesn't necessarily mean being intelligent or qualified for a job. We also need to consider the advantages that certain organizations receive because physically attractive individuals for certain jobs may be better perceived by clients who may trust them more. Furthermore, this ties into attractiveness discrimination, which is a subject that companies may take into account when it does not impact them or may completely ignore. Attractiveness discrimination could influence some people to no longer include their photos on their resumes, which is still very popular in Europe. However, during the interview, the recruiter may still rely on physical traits. In addition to analyzing all these elements, we will also see how physical attractiveness can impact the company's image and the dynamics between colleagues. It's possible that colleagues may get along better with a physically attractive person, integrating them into the group and the company, than they would with someone who is not considered attractive by society. It's also possible that the manager may have a better relationship with these types of individuals and praise them more for their work because they stand out more with their presence. The goal of this project is to open the eyes of future employees to the world of work and how it can sometimes

be unfair, without it necessarily being their fault. It is important to prepare oneself to face this world, avoiding unpleasant surprises and being resilient in the future. Even though one person alone cannot change things, it is important to discuss them and at least try.

MARKETING & FINANCE DEPARTMENT

Potential Market Expansion of Self-Cleaning Water Bottles for the Greater Oceania Region (Australia, New Zealand, and Indonesia) (Poster: Table 4)

Presenting Student: Jillian Davis
Faculty Mentor: Dr. Sudipto Sarkar

News coverage tends to highlight tragedies all over the world. Natural disasters across the globe have severely impacted the way in which societies live. For many, their basic needs are unable to be met during those times. From wildfires in Australia, to unhealthy drinking water in New Zealand, and minimal clean water access in Indonesia, the Greater Oceania Region has suffered greatly with their basic need of safe drinking water. Alongside these unpredictable situations, sustainability efforts have risen over the past several years, with more and more individuals doing what they can to help the planet. Self-cleaning water bottles can aid in the solution of having safe drinking water as well as provide a sustainable method of doing so. The purpose of this research is to delve deeper into the international market of self-cleaning water bottles as studied based on components of a global marketing plan.

MATHEMATICS DEPARTMENT

Foundations of Projective Geometry Via Pappus and Desargues (Poster: Table 16)

Presenting Student: Dawson Hormuth
Faculty Mentor: Dr. Mark Hughes

Elementary geometry has always taught us about the existence of parallel lines. Given a two-dimensional plane, anyone can draw two lines that would never intersect. However, in the projective plane this does not hold. No matter what two lines are chosen, they will always share one common point. This is carried out using a mathematical construction called the "line at infinity", an important idea in the field of projective geometry. To further understand this concept, it is necessary to look at two mathematicians who were at the forefront of the study, Pappus of Alexandria and Girard Desargues.

The Relation between Continued Fractions and Series (Poster: Table 16)

Presenting Student: Richard Day
Faculty Mentor: Dr. Mark Hughes

One of the more intriguing aspects of mathematics is the concept of infinity. In particular, taking a series of seemingly infinite elements to result in an exact value is both a puzzling and beautiful result of mathematics. Two such examples often come to mind when considering representations of infinite elements that converge: series and continued fractions. What is not immediately clear, however, is the interconnected nature that series and continued fractions share. Using techniques developed by Leonhard Euler, it can be shown that there is a direct correlation between the two processes, especially when put in the context of discovering the various properties of the ever-infamous irrational number π. This research project intends to address this correlation by examining its mathematical history while providing rigorous and modernized proofs of various statements related to series and continued fractions.

RECREATION AND PARKS MANAGEMENT DEPARTMENT

How Climate Change Has Affected East Coast Ski Resorts (Poster: Table 10)

Presenting Student: Emma Helton
Faculty Mentor: Dr. Curtis Clemens

This project investigates the adaptive strategies employed by East Coast ski resorts in response to warming weather patterns induced by climate change, aiming to address the contemporary challenges faced by these operations. By examining the current and ongoing impacts of climate patterns on East Coast ski resorts and their surrounding economies, this study seeks to shed light on adaptation efforts and provide insights into the future trajectory of these resorts. Given the direct and indirect reliance of entire communities on the ski industry, including employees, international students, tourists, and local businesses, understanding climate change's snowball effect on this sector is imperative. The research outcome will offer valuable insights to assist East Coast ski resorts in navigating climate challenges and sustaining viable business operations.

COLLEGE OF EDUCATION AND HEALTH & NATURAL SCIENCES

BIOLOGY DEPARTMENT

A Colorimetric Assay for β-Amylase Activity (Poster: Table 8)

Presenting Student: MacKenzie Freeze
Contributing Student: Sara Scanlan
Faculty Mentors: Dr. Rebekah Taylor, Dr. Berndsen, Dr. Monroe

Amylases are enzymes that function to break down starch into simple sugars called maltose that are usable within plants and animals. They break down starch to propel various metabolic processes within plants. Amylases also digest starch into glucose and short-chain maltodextrins, within the human body, which is used to fuel the body or for biosynthesis. Amylases also have potential industrial uses in food, fermentation, and pharmaceutical purposes. We assay Amylases to gain a further understanding of their substrate specificity and selectivity. The bicinchoninic acid (BCA) assay is a copper-based biochemical test that detects the reduction of copper (II) to copper (I) followed by the interaction of copper with bicinchoninic acid which leads to a color change from light blue to purple. BCA assays are commonly used to measure the concentration of proteins. However, the reducing ends of sugars can also contribute to the reduction of copper (II), and therefore the amount of reducing ends can be quantified. The goal of this project was to produce an optimized method to measure the enzymatic activity of β-Amylases (BAMs) using the BCA assay. Initially, we tested the sensitivity of this method in detecting reducing ends, finding a limit of detection of 0.25 mg/ml. We then determined whether we could reliably measure changes in reducing ends due to starch cleavage. Lastly, we formulated multiple saturation curves with the data we collected from the BCA enzyme assays to calculate the reaction rate and determine substrate affinity. We also applied the BCA assay to measure the concentration of dextrose as a model for testing the reliability of recycled plastic micropipette tips. From this work, we will continue to use this BCA assay method to further compare and describe the function of BAMs and to measure the concentration of substrates, which will aid in the development of new uses of starch for humans.

Advanced Microscopy Techniques (Poster: Table 8)

Presenting Student: Hailey Jenkins
Faculty Mentor: Dr. Rebekah Taylor

Microscopes have the power to see organisms and structures that the human eye is unable to resolve. Modern microscopy is used in all aspects of the scientific world from identifying plant cell

structures to being used as a diagnostic tool for pathologies. The purpose of this research is to compare forms of microscopy and identify their strengths. Microscopy techniques used include light microscopy, fluorescent microscopy, and scanning electron microscopy. Image processing and modification includes Z-stacking, tiling, cropping, and deconvolution. Sample preparation includes wet mount, crystallization, fluorescent staining.

Antibiotic Sensitivity of *Mycobacterium smegmatis* (Poster: Table 13)

Presenting Student: McKenzie Good
Faculty Mentor: Dr. Kumudini Munasinghe

Mycobacterium smegmatis is an aerobic, acid-fast, slow growing bacterium. *M. smegmatis* is rarely a human pathogen, but other bacteria of the genus *Mycobacterium* that are pathogenic are known for being antibiotic resistant. Examples of this include *M. tuberculosis* and *M. leprae*. Since there is not much widely available information about the antibiotic resistance of *M. smegmatis*, the purpose of this project is to determine if it is resistant to common antibiotics.

Bacteriological Analysis of Food and Water (Poster: Table 7)

Presenting Student: Hailey Jenkins
Faculty Mentor: Dr. Kumudini Munasinghe

What we consume is important to our health. There are regulations in place that monitor the quality of food and water to prevent the spread of water and food borne pathogens. One such contaminant found in both water in milk is coliform bacteria. Coliforms are a group of bacteria that is naturally present in the environment living in the soil, feces of animals, and water. Coliforms are gram negative bacilli, which include *Escherichia coli, Enterobacter aerogenes* and *Klebsiella pneumoniae*. Most coliforms are harmless to humans but there are some strains that are illness causing. The presence of bacteria such as coliforms in food and water is often an indicator of poor sanitary quality. The purpose of this research is to identify bacterial colonies in water, milk, and food. Samples for water were collected from Rocky Gap, Potomac River, and Frostburg's tap water. Raw milk and store-bought milk were obtained. Food samples were taken from local chain restaurants. Lab techniques used to identify bacteria include membrane filtration, spread plate, streak plate, selective media, and serial dilutions.

Bacteriological Analysis of Farmers' Market Produce in Allegany County, Maryland (Poster: Table 13)

Presenting Student: Devin Lissau
Faculty Mentor: Dr. Kumudini Munasinghe

Fresh vegetables and fruits are rich in vitamins, minerals, and fibers and they help maintain a healthy weight over high-calorie food. Eating fruits and vegetables protects us from free radicals produced by metabolic reactions and safeguards us from cardiovascular diseases and cancer. However, there has been an increased concern about foodborne diseases tied to contaminated farmers' market produce. In addition, there are very little information is available about the contribution of eating raw fruits and vegetables to human exposure to antibiotic-resistant bacteria. The objective of this research is to determine the prevalence of bacteria on fruits and vegetables sold in farmers' markets and analyze antibiotic susceptibility and resistance of isolated bacteria. Tomatoes, lettuce, strawberries, and cucumbers were collected from three farmers markets in Allegany County Maryland and transported to the microbiology lab at Frostburg State University, Maryland for bacteriological analysis. Bacteria were extracted from the samples using Tryptic Soy Broth for overnight incubation at 37^{o}C. Pure cultures were made for the identification of bacteria using the streak plate technique. Bacteria identification began with using the Gram-staining technique following biochemical tests such as Mannitol Salt Agar, Eosin Methylene Blue Agar, MacConkey Agar, Triple Sugar Iron Agar, DNase, Urease, Nitrate, Sucrose, Lactose, and Dextrose tests. The Kirby Bauer technique was used to analyze bacterial susceptibility and resistance to antibiotics such as Ticarcillin, Triclocarban, Polymyxin B, Ampicillin, Chloramphenicol, Streptomycin, Penicillin, and Tetracycline. The most prevalent bacteria in the isolates in tomatoes, cucumbers, tomatoes, lettuce, and strawberries were as follows: Cucumbers; *Salmonella enterica*, *Micrococcus luteus*, *Pseudomonas aeruginosa*, *Enterobacter aerogenes*, and *Bacillus subtilis*. Tomatoes; *Salmonella enterica*, *Escherichia coli*, *Enterobacter aerogenes*, *Serratia marcescens*, *Staphylococcus epidermidis*, *Serratia marcescens*, and *Enterobacter aerogenes*. Lettuce; *Enterococcus faecalis*, *Proteus vulgaris*, and *Pseudomonas aeruginosa*. Strawberries; *Enterobacter aerogenes* and *Enterobacter cloacae*. Kirby Bauer test results for antibiotic testing indicated that Penicillin 10mg and Ampicillin 10mg disks had less than 6mm of inhibition zones. The data obtained from this research will be useful in applying for outside grants to educate and train farmers and individuals involved in pre-and post-harvest processes such as transportation and selling in farmers' markets. Further identification of culturable and nonculturable bacteria will also be identified using Bacterial 16S gene extraction following PCR, and DNA fingerprinting to publish data in a peer-reviewed journal.

Bacteriological Analysis of *Salmonella typhimurium* Isolated from Chicken and Cantaloupe (Poster: Table 13)

Presenting Student: Lorena Pintar
Faculty Mentor: Dr. Kumudini Munasinghe

Salmonella typhimurium is a gram-negative pathogenic bacterium that is mainly found in the intestines. It frequently results in food poisoning and diarrhea in young adults and children. There were numerous reports of *S. typhimurium* outbreak in chicken and cantaloupes bought from the farmer's markets. This research focuses and tries to isolate the bacteria from the samples in chicken and cantaloupes bought on the closest farmer market. Using common methods in microbiology, such as streak plate technique and dilutions, the bacteria is isolated from the prepared samples and gram staining technique confirmed the presence of the *S. typhimurium* in the samples. The results will be supported *Salmonella typhimurium* successfully isolated and identified.

Comparing Incidence of *Borrelia burgdorferi* in Sideling Hill Tick Populations (Poster: Table 8)

Presenting Student: Alexander McNemar
Faculty Mentor: Dr. Rebekah Taylor

Controlled burning is often used as a method of controlling the health of a forest, including reducing the fuel load in an attempt to reduce forest fires. This also reduces the amount of shade that is favorable for tick survival. *Borrelia burgdorferi* is the causative spirochete of Lyme disease in both humans and other animals. Controlled burning was conducted at the Sideling Hill Creek Reserve. Ticks collected in the summers of 2021 and 2022 were collected in areas where controlled burning was conducted, and areas where controlled burning was not conducted. These ticks were analyzed by extracting their DNA, then PCR and gel electrophoresis were used to determine the presence of *Borrelia burgdorferi* in both populations.

Comparison of Hemp Populations from Different Seed Suppliers Using Microsatellites (Poster: Table 14)

Presenting Student: Dorian Jones
Faculty Mentor: Dr. David Puthoff

The exploration and documentation of Cannabis genetics is essential for the use and improvement of its possibilities in medicine, fiber, and feed. In addition, the standardization of breeding stock will allow more rapid progress in variety improvement. In this study, we are comparing the genetic structure of the same hemp variety from two seed suppliers using microsatellites. We want to determine whether strains of the same name, in this case Cherry Blossom, sold by different suppliers

are genetically similar enough to be classified as the same strain. Genomic DNA was purified, and 12 microsatellite loci were amplified using PCR. Gel electrophoresis for thirty-one hemp seed samples was used to document their molecular allele weights. Statistical tests that include Hardy-Weinberg Equilibrium and observed versus expected heterozygosity will be used to compare the two populations of seeds.

Estimating Great Egret Foraging Habits Based on Trophically Transmitted Endoparasites (Poster: Table 7)

Presenting Student: Cody Rowden
Faculty Mentor: Dr. Kate Sheehan

Wading birds congregate on aquaculture facilities, sometimes foraging on farmed products, and other times, consuming natural food sources nearby. While some waterbirds are suggested to be generalist feeders, individuals within a subpopulation exhibit more specialized diets. The infracommunities of trophically transmitted parasites indicate the feeding habits of avian definitive hosts. Further, in final hosts, parasites do not replicate, and the individual counts of parasitic taxa can tell us about the frequency of intermediate hosts that a bird has consumed. Culled Great Egret (GREG) from shrimp aquaculture ponds were processed for intestinal helminths, where preserved digestate was scrutinized for trophically-transmitted parasites. In the 50 birds assessed here, we found more than 9400 individual parasites, belonging to 17 estimated morphospecies. Despite the high overall richness, we found that the average GREG was host to only 3.3 spp. of parasite (min = 1, max = 6). Further, we found little evidence of differentiation in the diversity (H') of endoparasite communities. Acanthocephalans infected 22% of hosts, cestodes infected 28%, nematodes infected 28% and trematodes were found in 82% of GREGs evaluated here. The most frequently encountered parasite was a diplostomatid (n ~ 8000) in no other bird species collected from the same ponds. Our results suggest that, while GREG are capable of consuming a wide variety of prey, individuals appear to be more specific in their feeding habits. Using parasites as ecological indicators of host behavior is an intriguing tool for learning about the foraging breadths and specificities of individuals and populations.

Exploring the Invisible: Advanced Microscopy Techniques (Poster: Table 2)

Presenting Student: Madison Haynal
Faculty Mentor: Dr. Rebekah Taylor

Microscopy is a powerful tool that allows scientists to explore the world in a way that would otherwise be invisible to the naked eye. As a result of advances in microscopy techniques, scientists and students can image structures at a phenomenal level of detail and resolution. Cell biology, microbiology, and other disciplines of science have been revolutionized by these techniques. Images have been gathered by Frostburg State University students to display the invisible that is meant to

be explored. The techniques of stereo microscopes, fluorescence microscopes, and electron microscopes were learned. How to utilize microscope cameras and filters was applied to a range of specimens. The images collected were dissected with the eyes and the specimens were better understood by the students.

Exploring the Microscopic Universe (Poster: Table 2)

Presenting Student: Rebekah George
Faculty Mentor: Dr. Rebekah Taylor

Microscopy involves the use of microscopes to view objects that cannot be seen with the naked eye. Light microscopes use lenses and light refraction to increase an object's magnification and resolution. Different techniques can be employed by changing the type or angle of light or by using filters to obtain clearer images and emphasize different structures. In this project, stereomicroscopes (dissecting microscopes), upright compound epifluorescent microscopes, and an inverted microscope were used to view specimens at up to 400x magnification. Images were taken using brightfield, darkfield, differential interference contrast (DIC), phase-contrast, polarizing, and fluorescence microscopy techniques. Image capturing and stacking were accomplished using Nikon NIS Elements and Zerene Stacker software.

Exploring Trait Divergence and Morphological Variation in Parulidae Warblers (Poster: Table 7)

Presenting Student: Julia Davis
Faculty Mentor: Dr. Cody Kent

Environmental constraints and intra- and interspecific pressures are some of the many reasons species traits differ. Identifying the effects of the potential competing intra- and interspecific pressures of natural and sexual selection relies upon combining large datasets of niche-relevant traits with large-scale phylogenetic and spatial data. To do so, a variety of morphological measurements from the diverse adaptive radiation of parulid warblers were collected. Using specimens housed at the Frostburg State University Ornithology Collection as well as the National Museum of Natural History, we measured 14 morphological traits from 48 species of parulid warblers. Using ordination methods, we found that warbler species differ significantly among a variety of key axes potentially related to both natural and sexual selection. This variation can be primarily summarized across two primary axes: overall body size and arboreality. Additionally, we separately looked at variation in bill morphology. The wide variation in bill traits is of particular interest, both within and among species, due to potentially competing selection pressures for efficient foraging and sexual selection based on song quality. Future analyses, including merging this morphological data with large-scale spatial datasets will examine the roles of these morphological

differences in structuring communities as well as quantifying the differential impacts of anthropogenic changes across this family.

Feather and Distribution Characteristics of Seabirds Vary with Avian Ecologies (Poster: Table 1)

Presenting Student: Mick Lynch
Contributing Students: Max Summerfield, Hanna Muir
Faculty Mentor: Dr. Kate Sheehan

Without their wings, birds cannot fly (far) and would look quite disturbing. Even with wings, some birds are flightless, and use their anterior appendages to swim and/or thermoregulate. The efficiency with which a bird can travel, whether in the air or in the water, is not only aided by the presence of wings, but also by their shape, i.e., their morphologies. Take the Andean Condor for example, a large Cathartid vulture (wingspan of up to 10 feet) that uses its broad wings to catch thermals and soar for long distances as it forages. Alternatively, the gentoo penguin, a seabird that uses its wings not for flight but for high-speed swimming, reaching speeds of 22 mph. Birds' wings are key features in their daily activities, and understanding their wing morphology is a key step in understanding avian ecology. Seabirds are a diverse subgroup of avifauna with distinct behaviors along spectra of foraging and migration strategies. The morphologies of their wings and feathers are likely to correspond with the ways that they fly, and the strategies used while foraging. Here, we assess the wing feathers of four species of seabirds: Northern Fulmar (*Fulmarus glacialis*), Northern Gannet (*Morus bassanus*), Thick-billed Murre (*Uria lomvia*), and Red-throated Loons (*Gavia stellata*). These species exhibit different foraging strategies, ranging from plunge diving, surface diving, plunging, or surface dipping. Furthermore, some of these species will actively swim underwater using a combination of foot and wing propulsion. The flight patterns of these birds also differ seasonally, when during breeding season flights between nesting colonies and foraging grounds occur, and in the non-breeding season, flight durations at sea are much longer. Here we compare the morphologies of the feathers among our focal species to learn how their ecologies impact their morphologies. To accomplish this, we plucked all the feathers from at least one wing of each species, assessed for condition (pin feathers, broken, missing, or infected with parasites), and photographed each feather. The carcasses of seabirds were donated to the FSU Parasites & Plastics Ecology Lab and maintained at -20°C until processing. We measured the inner diameter of each feather with a series of steel gages, and feather length was determined from photographs using ImageJ (Fiji with Java 8) software. We present comparisons of the surface area of flight feathers of the wing with each bird’s body mass to determine the wing load of each species and discuss their similarities and differences based on ecological niche. With this information, we help document variation in the form and distribution of feathers on a seabird’s wing within an ecological context.

Genetic Diversity between Fiber Hemp and CBD Hemp Seeds (Poster: Table 14)

Presenting Student: MacKenzie Freeze
Faculty Mentor: Dr. David Puthoff

Hemp, *Cannabis sativa*, is grown primarily for industrial and consumable use. Hemp seeds and oils are used to make many food products including hemp milk, hemp oil, etc. because it is a good source of healthy fat, protein, minerals, vitamins, and fiber. Hemp seeds are also a good source of magnesium, vitamin E, potassium, iron, zinc, and phosphorus. Hemp seeds have many benefits to health including protecting the brain, boosting heart health, reducing inflammation, improving skin conditions, and relieving rheumatoid arthritis. CBD hemp seeds are used to make CBD/Hemp oil that comes from the female flowers of the cannabis plant and has been shown to reduce inflammation. This project investigates the genetic diversity between these two types of hemp. This information is important when considering the industry of plant breeding and the consistency of hemp products. The methods of this study include extracting DNA from many individuals of each type, amplifying their DNA using polymerase chain reaction (PCR), and then separating the DNA fragments by their size using gel electrophoresis. So far, the DNA of 10 samples of fiber hemp and 10 samples of cherry wine CBD hemp have been extracted and analyzed using 12 different microsatellite primer sets. This project will be completed using the statistical package R to analyze the data gathered from the gels. This project can be continued in the lab by looking at more samples and species of fiber hemp and CBD hemp seeds, along with using more microsatellite primer sets.

Identification of Cancer-Related Genes using Genetic Mapping in *Drosophila* (Oral Presentation: Room 110 from 11:30-12:00)

Presenting Student: Sarah Clark
Faculty Mentor: Dr. David Puthoff

Fly-CURE, launched in 2012 at the University of Detroit Mercy, is a nationwide Course-Based Undergraduate Research (CURE) program. Its primary objective is to investigate and analyze novel mutations induced by ethyl methanesulfonate (EMS) in a genetic screen. These mutations are specifically associated with genes that govern cell growth and cell division during the development of the Drosophila eye. The project encompasses traditional Mendelian genetics, molecular genetics, and bioinformatics approaches. In this project, I specifically studied the differences in eye tissue growth phenotypes resulting from the EMS-induced mutation. In addition, to pinpoint the genomic locus responsible for the observed phenotype, I employed complementation mapping by crossing the lethal phenotype with a series of defined chromosomal deletion stocks. In the follow-up complementation testing, we will employ smaller deletions and/or specific null alleles of individual genes within the genomic region initially identified during the first round of complementation mapping. The goal was to pinpoint a more precise region where the mutation might be located. To identify the specific point mutation, I isolated genomic DNA from both the mutant and control fly stocks, designed PCR primers targeting a small region (approximately 500-1000 nucleotides) within

the chosen candidate genes, amplified this targeted region using PCR, and sequenced the amplified DNA from both the mutant and control stocks. Future work will involve identifying potential human homologs to the mutated fly gene using bioinformatic methods including BLAST (protein and nucleotide). In addition, hypotheses on the potential role of the identified gene and its encoded protein and its role in cell division and growth will be explored.

Illuminating Insights into Human Biological Structures (Poster: Table 8)

Presenting Student: Joshua Hershey
Faculty Mentor: Dr. Rebekah Taylor

Microscopy is not only a tool used for researching the world around us, but in itself a field rich in discovery and art. It also plays a key role in the field of medicine, primarily when diagnosing diseases or ruling them out. Through various methods of fluorescent staining with antibodies, lectins and phalloidins, or through light microscopy techniques such as differential interference contrast (DIC) and phase contrast, we can examine the utility of microscopy in unraveling the complexity of cellular and tissue structures.

Investigating Lineage of Hemp Strain (Poster: Table 14)

Presenting Student: Seyanna Rodney
Faculty Mentor: Dr. David Puthoff

The research being done is genetic hemp research. This research is being done to see if the lineage of hemp seeds is what the manufacturers claim them to be. What has been done so far is DNA isolation from three different hemp seeds, the two parents and the claimed offspring. Then PCR was done using 12 different primers followed by gel electrophoresis and imaging. All that is left to do is analyze the results and determining if the claimed offspring is actually a cross between the two claimed parents.

Microscopy: Science and Art (Poster: Table 2)

Presenting Student: Raina Christensen
Faculty Mentor: Dr. Rebekah Taylor

Using the skills learned in microscopy, I intend to showcase how this visual-based science can also function as a way to create and appreciate visual art. The history of microscopy is intertwined with artistry, with many pioneers in the field of microbiology either working in a creative field or collaborating with sketch artists to illustrate microscopic organisms. I will be talking about how there is inherent artistry in the sectioning, staining, and mounting of specimens onto slides, as well as the

way the specimen can be viewed using camera software. While showcasing photos of each microscopy technique, I will explain said techniques and the process undertaken to get the final photo. I'll also discuss how viewing microscopy as an art form can be beneficial for scientific research, as you need a well-prepared slide to collect and analyze any data from it.

Molecular Identification of Two Species of Cottontail Rabbits (Poster: Table 2)

Presenting Student: Skyler Slimmer
Faculty Mentor: Dr. William Seddon

The Appalachian Mountains are home to two species of cottontail rabbit: the eastern cottontail (*Sylvilagus floridanus*), and the Appalachian Cottontail (*Sylvilagus obscurus*). The two species are only distinguishable through morphological measurements on skulls of deceased individuals, or through complex DNA analysis, neither of which are practical for wild populations. From the management perspective, a minimally invasive protocol for species identification would be preferable. Previous studies have shown that sex of individuals from numerous mammal species can be determined using DNA extracted from tissues or scat and completing a PCR-based protocol. Using DNA extracted from rabbit tissues, we are evaluating the use of a set of primers (designated LGL331 and LGL335) to develop a simple, noninvasive PCR method of species identification. The goal of this research is to optimize the PCR protocol and determine its usefulness in identifying the rabbit species of interest.

Organic Gluten-Free Chips from Legume-Based Flours (Poster: Table 7)

Presenting Student: Joshua Hershey
Faculty Mentor: Dr. Kumudini Munasinghe

Chips have become a staple snack food in millions of households in the Unites States. Statistics have shown that consuming one serving of chips per day is linked to more weight gain over the course of a year than one serving of any other food per day. The market for organic, healthier chips has been on the rise for over a decade, and so an experiment was undertaken with the goal of producing organic, healthy chips with limited ingredients from legume-based flours made from ground chickpeas, daal, and mung beans.

Parasite Fecundity in Avian Species (Poster: Table 1)

Presenting Students: Elizabeth Jenkins, Quinton Browne, Maree Deitrich, Reagan Mangum
Faculty Mentor: Dr. Kate Sheehan

Parasites are natural inhabitants of many ecological systems, yet they often cause harmful effects in the organisms they infect. Because they need a host, parasitic species are always found in conjunction with other species. This allows us to obtain parasites easily, as we can often extract them from the larger organisms they tend to infect. In this study, our goal was to examine multiple nematode species obtained from various avian species in an effort to compare their fecundity between the lower gastrointestinal tract and the upper gastrointestinal tract of the birds. We examined the parasitic worms using a microscope. We calculated worm length, egg number (if present), egg diameter (if present), and noted any oddities present in or on the worm. A ruler and an online software program (ImageJ) were used to determine the numerical values for worm length and egg diameter. In addition, only three of the observed eggs were measured and the mean of those three was taken for the statistical analysis. The eggs were counted based off what the observer could see. We examined over thirty worms total to ensure a large enough sample and the data was then collected and analyzed in Excel using a two-variable T-test. We did not predict one internal location (upper GI tract or lower GI tract) to be favored over the other, as the goal was to compare the two to understand how they supported nematode fecundity. However, we hypothesized that nematodes living in a more favorable internal environment would produce larger, more numerous eggs.

Seasonal Consumption of Microplastics and their Impacts on Infrapopulations of Parasites (Poster: Table 1)

Presenting Student: Andrew Held
Faculty Mentor: Dr. Kate Sheehan

Migratory species encounter a myriad of environmental conditions as they move throughout their ranges. In addition to interactions with a variety of intermediate hosts that can transfer parasites, migratory individuals also can interact with environmental contaminants, like microplastic pollution. Here, we assessed waterbirds (Double-crested Cormorants: DCCO and Lesser Scaup: LESC) collected from baitfish ponds in the southern US throughout the year. We found that birds arriving in their non-breeding territories contained more microplastics than those that had been present in their non-breeding range for several months, suggesting that their northern breeding areas contained more contaminants than the aquaculture ponds where they winter. Additionally, we find differences in the frequencies of plastic contaminants between species, and the frequencies of parasites that infect migratory birds. Despite the temporal trends observed in plastic consumption, it appears that parasite frequencies remained consistent among seasons, suggesting that, while migratory birds interact with aquaculture facilities in their non-breeding season, they continue to also interact with

prey that are similar to those, from a host-parasite perspective, that are available in their northern breeding habitats.

Stuck on You: Microplastics Adhering to Gill Structures of Freshwater Fish (Poster: Table 1)

Presenting Students: Nathan Bowman, Grace Armendariz, Leah Stevens, Matt Helmbrecht
Faculty Mentor: Dr. Kate Sheehan

Microplastics, defined as plastics between 0.5 and 5 mm in size, are becoming the most prevalent pollutant accumulating in aquatic systems. Despite being reported in the gut contents of aquatic vertebrates, their impacts are poorly understood. Here, we document intentionally introduced ambient microplastic prevalences and quantities in the respiratory system of lotic and lentic fish species. Black Nose Dace (*Rhinichthys atratulus*) occur in flowing freshwaters like Sand Spring Run, Frostburg, MD. Three-spined stickleback (Gasterosteus aculeatus) occur in inland and coastal ponds. We assessed samples of Black Nose Dace from Frostburg, Maryland and samples of the Three-spined stickleback from Cheney Lake in Anchorage, Alaska. We compare the morphological features of the two species, including gill raker density and length, fish total length and weight, and develop an index for fish morphology. We compare this index to the number of microplastic fibers observed in their respiratory system. Additionally, the black nose dace was part of a previous study, where samples were experimentally introduced to a fluorescent microplastic polyethylene sphere. Based on the two different types and shapes of microplastics, we evaluate how gill morphology might affect the consumption and expulsion of microplastics.

The Effect of Nitrogen Fixing Bacteria on Crop Growth (Poster: Table 13)

Presenting Student: Blake Miller
Faculty Mentor: Dr. Kumudini Munasinghe

Nitrogen-fixing bacteria utilize nitrogen as a primary nutrient to grow and replicate. These bacteria convert atmospheric nitrogen (N_2), which is mostly inert, into ammonium (NH_4^+), nitrite (NO_2^-), and nitrate (NO_3^-), which are all usable by plants. Two such nitrogen-fixing bacteria are *Rhizobium leguminosarum* (RL) and *Cyanobacter anabaena* (CA). Tomatoes, beans, cauliflower, corn, and wheatgrass are all crops that would potentially benefit from a symbiotic relationship with these bacteria. This research is centered on determining if the presence of nitrogen-fixing bacteria in the soil will affect the growth of these crops.

Using Microsatellites to Establish Genetic Lineages in 10 Samples of *Cannabis sativa L* (Poster: Table 14)

Presenting Student: Sarah Clark
Faculty Mentor: Dr. David Puthoff

The purpose of this research project was to use microsatellite sequences to establish genetic lineages in 10 samples of a strain of *Cannabis sativa L* by using various molecular biology techniques such as DNA extraction, DNA quantification, polymerase chain reaction (PCR), and gel electrophoresis. DNA Extraction was used to extract DNA from the nucleus or mitochondria of a sample. In this project, nucleic acid DNA was extracted. DNA Quantification is the process of utilizing a spectrophotometer to determine the average concentration of DNA present in a sample. Polymerase Chain Reaction (PCR) is a technique designed to create countless copies of a specific DNA region. These reactions rely on thermostable DNA polymerase and require DNA primers (microsatellite markers) designed specifically for the region of interest. In the process, the reaction is cycled through a series of temperatures which allow those copies of the target region to be produced. Twelve different microsatellite markers with their amplification conditions were used to determine the lengths of alleles in the DNA samples. Gel electrophoresis is the process in which DNA fragments are separated according to their size, which helps the researcher determine what alleles are present in each sample. Genetic structure of the populations (different seed suppliers) will be analyzed using PopGenReports in R and include observed vs. expected heterozygosity and other statistics. All samples were from a strain of hemp called BaOX.

CHEMISTRY AND PHYSICS DEPARTMENT

Analysis of Heavy Metal Content in Applesauce (Poster: Table 9)

Presenting Students: Lucy Brown, Ryan Wade
Faculty Mentor: Dr. Katie Gares

Commercially available apple sauce in pouches, cups, and containers are common snack items for children and adults. These products may expose consumers to heavy metals, including lead, that most are unaware of when purchasing the products. Fruits are grown outdoors where they are exposed to heavy metals in water, soil, and fertilizer. The apples are exposed to heavy metals during the production and manufacturing process. The apple sauces made from these apples are at risk of exposing consumers to heavy metals. This research project aims to determine if any heavy metals, specifically lead, can be detected in a variety of brands, packaging, and flavors. The goal is to determine if the heavy metals in apple sauce follow FDA guidelines and/ or pose a health risk to consumers. The techniques being used are Microwave Digestion, Atomic Absorption Spectroscopy (AA), Inductively Coupled Plasma Spectroscopy (ICP), and X-ray Fluorescence (XRF).

Analysis of Niacin in Energy Drinks (Poster: Table 9)

Presenting Student: Alexander McNemar
Faculty Mentor: Dr. Katie Gares

Energy drinks are a popular dietary supplement, especially among college students and teenagers who are attracted to their advertised benefits, including increased concentration and alertness. Niacin is an essential metabolite in the human diet, but excess niacin in the diet can cause detrimental effects to the consumer, including liver failure. Traditional methods for the detection of niacin include the use of microbiological agents, and High-Performance Liquid Chromatography. Gas Chromatography/Mass Spectrometry also offers a method for detection and quantification. A method for the detection and quantification of niacin in energy drinks was developed.

Biomedical Application of MoS_2 Nanoparticles for Potential Use in Urea Absorption from the Waste (Poster: Table 9)

Presenting Student: Owen Frank Sealy
Faculty Mentor: Dr. Fayan Meng

A wearable artificial kidney (WAK) is designed to provide continuous dynamic dialysis for uremia patients. The idea of a worn artificial kidney has been investigated by a multitude of independent researchers and research groups. However, commercial use is held up due to the low urea

absorption capacity of materials used to absorb urea from waste dialysate. This research aims to investigate the urea absorbance capacity of MoS2 and surface modified MoS2 nanomaterials from aqueous urea solution and waste dialysate. MoS2 nanomaterials hold many characteristics that increase their potential as a urea adsorbent, such as a layered hexagonal structure and easy access to sulfur-binding sites that bond to urea's amino group. A series of experiments will be conducted by incubating MoS2 with urea aqueous solution in a concentration (300 mg/L) comparable to the urea concentration of chronic kidney disease patients at 37 °C. One sample will be removed at ten-minute intervals and, while the rest are allowed to continue to react, this process is repeated for 60 minutes. The samples are then centrifuged to separate the urea solution from the MoS2. Then, 5mL of the treated aqueous urea are extracted from the sample and stored for spectrophotometric analysis. The experiment results show that, over time, the absorption capacity of MoS2 is 12 mg/g under 30 minutes incubation, which is higher than activated carbon's absorption of urea and comparable to many other materials. The modification of the surface of MoS2 which could increase the absorption capacity is ongoing.

Heat Dissipation Due to Eddy Currents (Poster: Table 3)

Presenting Student: Dylan Spano
Faculty Mentor: Dr. Jason Speights

This project studies heat dissipation due to eddy currents. This has applications to passive methods of motion, such as a wind turbine, to produce heat. In this research, a rotating disk of magnets is used to induce eddy currents in different metals. The changes in temperature are analyzed using Python to understand the power generated. Do these eddy currents generate enough power to boil water?

Heavy Metal Analysis of Baby Food Squeeze Pouches and Applesauce (Poster: Table 15)

Presenting Student: Carolyn DeSena
Faculty Mentor: Dr. Katie Gares

Recently there have been many reports of baby food manufacturers, specifically Nurture, Beech-Nut, and Gerber, knowingly selling their baby food with high levels of heavy metals to consumers. As many parents feed baby food to their children, these reports are of high concern. Heavy metals are natural elements of the earth; thus, they are found in the ground in which many of the baby food crops are grown. Heavy metals can also be incorporated into baby food during the manufacturing process. When children are exposed to high levels of heavy metals for a prolonged period it can lead to cancer, chronic disease, and neurotoxic effects. The purpose of this research project was to determine if any heavy metals, specifically lead, can be detected in a variety of brands, including those listed above. The goal was to determine the concentration of heavy metals

present in the baby food samples and compare the concentrations to FDA standards. The techniques being used to complete this research project are Microwave Digestion, Atomic Absorption Spectroscopy (AA), and other instruments that can determine concentrations of heavy metals in baby food.

Measuring Peptidase Activity of Commercial Gluten-Cutter Digestive Aids using Protein Assays (Poster: Table 9)

Presenting Student: Joshua Hershey
Faculty Mentor: Dr. Holly Curie

Celiac disease affects roughly 2 million people in the US alone. It is a chronic autoimmune disorder for which there is no cure and involves harmful inflammatory reactions to gluten in the gastrointestinal tract that can lead to damaged intestines. The only evidence-based treatment is a gluten free diet. However, commercially sold gluten-cutter dietary supplements are full of enzymes and claim to improve digestion of gluten when taken with meals. An experiment is proposed to use protein assays to measure peptidase activity of these supplements in an attempt to yield data that either supports or rejects the claim that these supplements actually help digest gluten.

GEOGRAPHY DEPARTMENT

A Paramount Plume: Saharan Dust (Oral Presentation: Room 113 from 1:30-2:00)

Presenting Student: Katlyn Barbee
Faculty Mentor: Dr. Matthew Ramspott

This research examines the historical and scientific context of the trans-Atlantic journey of Saharan dust, sharing how it shapes the ecology and climate on a global scale. The interest in the Saharan dust transport is an ongoing investigation that has had a long span of history. Many of the first discoverers were not seeing dust, but rather they had ancillary research objectives, where evidence of Saharan dust was first accumulated. The presence of fragments of fossilized freshwater diatoms was found, with its composition furthering implications of its importance. These diatomite-rich sediments of the Holocene-age consist of mostly "...hollow diatom frustules of biogenic silica that have a very low bulk density (c. 0.8 g cm− 2), are cemented by authigenic calcite, Mg-calcite, aragonite and gypsum, and are fragile and easily broken" (Bristow et al., 2009, Bristow et al., 2010). These fossilized microorganisms are packed with phosphorus among other important components like ferric oxide minerals (hematite and goethite) (Moskowitz et al., 2016). This information has supported the notion that the Saharan dust is crucial to the health of Earth's ecology and knowledge about how it affects the planet's climate. Changes observed in Earth's climate from the mid-20th century into modern times have been driven by anthropogenic sources. This climate change threat is impacting the future of the Saharan dust transport phenomenon. Despite many analyses and predictions, current trends of anthropogenically induced global warming make the future uncertain.

Desegregation and Integration at Frostburg State: The Legacy of Pansye Atkinson (Oral Presentation: Room 113 from 1:00-1:30)

Presenting Students: Olivia Cooper, Julia Seddon
Faculty Mentor: Dr. James Saku

Pansye Atkinson was born in Asheville, North Carolina on June 10, 1930. She was a member of staff at Frostburg State from 1969 to 2005, acting first as Integration Coordinator, then Director of Minority Affairs, and finally as Director of Affirmative Action and Equal Employment Opportunity. In Mrs. Atkinson's 36 years of service to Frostburg State University, she made an immeasurable impact on recruitment, enrollment, and retention of minority students. She worked towards making FSU a more inclusive, diverse campus where students are exposed to a world of possibilities and opportunities. Throughout her time at FSU, Pansye Atkinson brought African American speakers and lecturers to the campus and organized events that were centered around black issues and culture. Mrs. Atkinson wanted to ensure that black students felt a sense of belonging at Frostburg State College. She did not want them to feel ostracized, so she was heavily involved with student organizations. Mrs. Atkinson also served as the faculty advisor for the Black Student Alliance (BSA),

which was originally founded as the Afro-American Society. One of the first actions Mrs. Atkinson took as the Integration Coordinator was creating an advising system specifically tailored to the needs of black freshmen. The students would have an advisor from the Office of Minority Affairs for their first year or two of enrollment before switching to an advisor within their chosen major. Due to Pansye Atkinson's dedication, today's minority students at Frostburg have consistent opportunities to thrive in their education, as well as opportunities to learn about their histories and cultures through classwork, guest lecturers and presentations, student organizations, and cultural events.

Frostburg State University Sustainability Guide (Poster: Table 16)

Presenting Students: Evan Dere, Lina Goetz, Kevin McDanal, Connor Schweikart, Sydnie Scire
Faculty Mentor: Ms. Tracy Edwards

SUST 455 students are developing a Campus Sustainability Guide to introduce students, faculty and staff to the UN Sustainable Development Goals (SDGs) and present a framework toward understanding and advancing sustainability across all areas of university life. This Guide draws on examples used at other higher ed institutions, aiming to make connections between established FSU practices and the SDGs. This poster presents initial drafts of the key sections of this Guide, including Transportation, Recycling, Campus Biodiversity, Ways to Get Involved and a Campus Sustainability Walking Tour.

The Waxing and Waning of the La Perouse Glacier (Poster: Table 16)

Presenting Students: Marianna Day, Gavin Hill, Zander Linn, Hannah Muir, Jenna Riley, Sarah Wentling
Faculty Mentor: Dr. Phillip Allen

A comparative study analyzing the waxing and waning of the La Perouse Glacier in Alaska from 1959 to the present, focused on changes in glacier extent and associated geomorphology. Using stereo aerial photography, we examined key factors such as glacial coverage, visible sediments, topographic features and meltwater channels that have adapted to climatic forces over the past 65 years. By using historical data and modern-day satellite images, we provided insights to glacial dynamics, sediment transport, and landscape evolution. The Glacier has shrunk circa -0.5 - 1km along its entire perimeter of the piedmont portion of the glacier. These findings will contribute to our understanding of glacier responses from climate variability and inform future projections of glacier behavior.

FSU Undergraduate Research Symposium Committee

Karen Keller, Biology (Chair)
Phillip Allen, Geography
Hayley Baer, Chemistry and Physics
Jill Chihak, English and Foreign Languages
Matthew Crawford, Chemistry and Physics
Erica Kennedy, Psychology
Marc Michael, Mathematics
Eric Moore, Chemistry and Physics
Benjamin Norris, Chemistry and Physics
William Seddon, Biology
Kate Sheehan, Biology
Rebekah Taylor, Biology
Clara Thiel, Biology
Gregory Wood, History

Sharman Adams, Associate Provost for Student Success and Graduate Education
(Opening Remarks)

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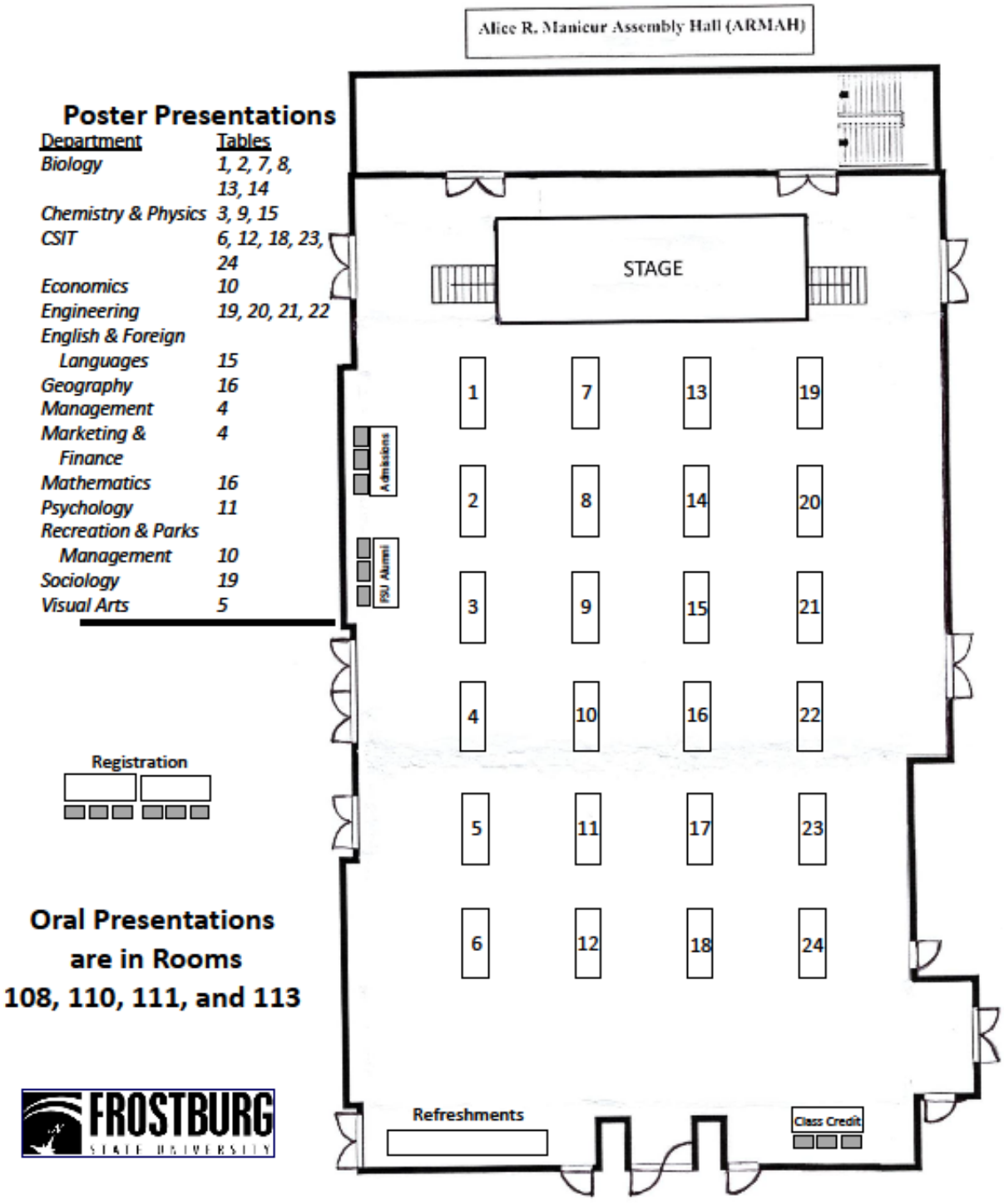
To the staff of the Print Shop, the Lane Center, the Physical Plant, the FSU Foundation, and Chartwells for all their assistance in the preparation of the Symposium.

Most importantly, to the Students and their Faculty and Staff Mentors for making the Symposium possible!

Frostburg State University
Undergraduate Research Symposium 2024



LANE CENTER ROOM 108	
Time	**Oral Presentation and Presenters**
11:30-12:00	**Hidden Disabilities in the Workplace** *Eric Denham, Shannon Casey, Teresa Wolf, Nakya Pack (Management)*
12:00-12:30	**Enhanced eBook Reading Experience: A Java-Based ePub Reader** *Jaydason Miller, Christian Pross, Austin Comeaux, Adetola Adekanmi (Computer Science and Information Technologies)*

LANE CENTER ROOM 110	
Time	**Oral Presentation and Presenters**
11:30-12:00	**Identification of Cancer-Related Genes Using Genetic Mapping in *Drosophila*** *Sarah Clark (Biology)*
12:00-12:30	**Maximizing Impact: Leveraging Social Platform Analytics for Enhanced Engagement and Outreach** *Jermya Williams (Communication)*
12:30-1:00	**Working to Live to Work? Repairing a Burnt-Out Workforce by Improving the Work-Life Balance** *Amanda Stanley (Communication)*

LANE CENTER ROOM 111	
Time	**Oral Presentation and Presenters**
11:30-12:00	**The Effects of Machismo in Latin America and How to Combat It** *Hailie Toro (Women's Studies)*
12:00-12:30	**The Legacies of the Carceral State: Policing and the Power of Resistance** *Callie Miller (Sociology)*
12:30-1:00	**Everybody Hates Chris: A Moral and Ethical Analysis of Chris Brown** *Chandler Nelson (Sociology)*
1:00-1:30	**Gender and Tropes in Romance-Fantasy Webtoons** *Sydney Smolenski (Women's Studies)*

LANE CENTER ROOM 113	
Time	**Oral Presentation and Presenters**
11:30-12:00	**Irresistible Instagram: The Negative Effects of this Social Media Platform on Adolescents** *Alyssa Kush (English and Foreign Languages)*
12:00-12:30	**What it Takes to be a Man** *Hannah Lebo (English and Foreign Languages)*
12:30-1:00	**The Implications of *Watchmen's* Commentary on Ideological State Apparatuses** *Mason Wolf (English and Foreign Languages)*
1:00-1:30	**Desegregation and Integration at Frostburg State: The Legacy of Pansye Atkinson** *Olivia Cooper, Julia Seddon (Geography)*
1:30-2:00	**A Paramount Plume: Saharan Dust** *Katlyn Barbee (Geography)*