

2023 Annual Student and Faculty OSCARS

Outstanding Scholarship, Creative Activities and Research Symposium

April 26-May 9, 2023

In Person and Virtual Events Scheduled throughout the Week (all events on the Rapids Campus)

Wednesday, April 26, 2023

11:00am-1:30pm Spring Picnic (River Plaza/Cafeteria)
 1:00-1:15pm Welcome, Land Acknowledgement and Opening Remarks; Legacy Room
 1:15-2:00pm Oral Presentations; Legacy Room and C256
 2:00-3:00pm Poster Session (Legacy Room) and Art Exhibition (Visual Arts Upper Atrium)

Thursday, April 27, 2023 - Creative Arts Theme Day

12:30-1:30pm Materials, Sustainability and Clothes: Creative Responses to the Crisis of Climate and What We Wear (B214 and Zoom)
 5-7pm Graduating AFA Arts Student Reception (Visual Arts Upper Atrium)
 5-5:50pm Rapids Review Release and Reading (Riverview Room)
 6-6:45pm Creative Arts Showcase (M109)
 7-8:30pm Carmen Machado Live Stream (Riverview Room)

Friday, April 28, 2023

7:00pm Jazz Ensemble Concert, Performing Arts Center

Monday, May 1, 2023 - Sustainability Theme Day

10:00am Raptors of Minnesota Presentation (Legacy Room)
 11:00am Sustainability Kahoot: What do you know about climate change? (Student Center and Zoom)
 1:00-3:00pm Film Screening and Discussion: The Letter – A Message for our Earth (B202)
 7:00pm Concert Choir Concert (Performing Arts Center)

Tuesday, May 2, 2023

7:00pm Concert Band and String Orchestra Concert (Performing Arts Center)

Thursday, May 4, 2023

7:00pm World Drumming and Guitar Ensemble Concert (Performing Arts Center)

Monday, May 8, 2023

7:00pm AFA Recital: Showcasing graduating Music Students (Performing Arts Center)

Project Categories:

- ¹ STEM/Health and Exercise Science
- ² Social Sciences/Humanities
- ³ Creative Arts and Activities

Project Descriptions/Abstracts

Oral Presentations

Student Presentations 1-4 in Legacy Room, Faculty Presentations 5-7 in C256. Student Presentations 8-19 are recorded video presentations available on Symposium (direct video links also provided)

1. Chloe Genda: [Ball Exercise project - Acting Movement Class](#)³
Faculty Mentor: Blayn Lemke
This exercise asks the student to create a story that addresses a theme of “ Recognition”. This recognition could be a moment the student was recognized for something in their past, a recognition of something within themselves or a recognition about life or another person. The pieces are 5 minutes in length and done without language. In the story the student is given a La Crosse ball that serves as the students scene partner. The ball can be another person, an animal or an emotion that influences the story's action. The student is also taught seven tricks (part of teaching circus skills)with the ball that have to be included in the physical telling of the story. The tricks include: Tossing the ball over the head and catching it behind the back, bouncing and catching the ball on the back of the hand, carrying the ball in a unique manner, arch throw over the head and caught by the opposite hand, interacting with the ball rolling, bounce spin and catch the ball and rolling the ball down the arm and catching it in an opposite hand. This exercise requires to invest in an object as a scene partner, embodying it with meaning as well as demonstration control and intention when including an object into an acting scene. Music may be used.
2. Carmen Evander, Ben Swanson, Larissa Tollefson, Daisy Wawers, Rex Wheeler: Say It Again³
Faculty Mentor: Blayn Lemke
A set of three short acts (30 sec, 1 min, 2 min) that each provide different scenes and subtext to the same script.
3. Steven Righter, Josh Orcutt: [The Last Voyages of the HMS Terror and Erubus](#).³
Faculty Mentor: Blayn Lemke
This is a performance piece inspired by Barry Lopez's novel Arctic Dreams. In this passage from the book Lopez describes the final voyage of the HMA Terror and Erebus which was trying to find a passage through the Arctic Circle in 1845.The students also researched the history of the ship, Captain Franklin, provisions stored on the long voyage to have a fuller understanding of the text. Earlier in the semester the class learned about creating a British dialect and the students chose to incorporate this language component into the final presentation. The fabric used suggests the icebergs Franklin and his crew encountered. Theatrical performance styles present in this project are: Physical storytelling, Neutral Mask work and Tableau Vivant.
4. Alexander Hayes: [Brown Sugar Matcha](#)³
Faculty Mentor: Liz Kuivinen
I wrote a song in songwriting class.

5. Katie

Berg and Jacqueline Bayless: Fostering Dual Credit Courses in High School: Leveling Expectations²
Faculty Presentation

For many high school students, enrolling in a college course while still in high school is daunting, especially for dual credit English courses. Teachers and school leaders must be deliberate in how they promote dual credit courses. After two years of working together through ARCC's Concurrent Enrollment program, ARCC English Faculty Katie Berg and Columbia Heights Faculty Jacqueline Bayless have found multiple methods that help ensure success with constant communication about expectations with students. This presentation explores select successful practices and suggestions for other concurrent enrollment teachers, as well encouraging an exchange of ideas to continue to work towards collaboration and excellence in the concurrent enrollment program.

6. Mojtaba Moniri: Further Rare Concurrencies: Ramsey Rare, Wondrously Non-Rapids¹

Faculty Presentation

We present whole numbers about 108-110 digits long that are very rare simultaneously with respect to two properties. One aspect would be called Ramsey-rare (Ramsey was also a Mathematician!), and the other is like non-rapid wondrous hailstones. We will use our numbers as serial numbers of tokens² and list them as NFTs, a continuation of similar rarities we have already listed on opensea.io.

7. Mo Janzen: Beyond Simple Teaching Personas: Developing Pedagogical Personality to Achieve Course Aims²

Faculty Presentation

We believe that as we design a course, we need to think not just about our learning goals, assessments, and pedagogy, but that we also need to think about what kind of pedagogical personality or persona we want to adopt. While we primarily utilize the established language of teaching persona to describe this personality, we want to suggest that a teaching persona is not a natural expression of one's personality in the sense of who we are with friends and family. A teaching persona requires the cultivation of a distinct pedagogical personality. Further, the choice of a pedagogical personality is just as important as course design decisions, and needs to be made just as intentionally and just as strategically. Finally, as we discuss the different personas, we do so from the perspective of student-centered learning, and the importance of backward course design. While some of the personas we describe may not, by themselves, be student centered, our overall argument, that we must cultivate more than one pedagogical personality, is student centered.

8. Emma Doerr: [How Temperatures affect bodies of water and the Environment in Minnesota](#)¹

Faculty Mentor: Joan McKearnan

Presentation video that talks about how air temperatures affect bodies of water in Minnesota

9. Eldijana Lilic: [Climate Change in Minnesota](#)¹

Faculty Mentor: Joan McKearnan

This presentation goes over the increasing average temperatures in Minnesota from the years 1895-2023. More specifically, looking at how it has impacted these specific climate divisions in Minnesota; Central, East Central and South Central Minnesota.

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10. Sara Mansour: [How Does Precipitation Change in West Vs East Minnesota?](#)¹
Faculty Mentor: Joan McKearnan
I will be showing the precipitation differences on both sides of the state and how climate change will create problems in the future.
 11. Aurora Erickson: [Plant Diversity of Prairie, Old Field, and Forested Regions within the Anoka-Ramsey Natural Area](#)¹
Faculty Mentor: Kristen Genet
Anoka-Ramsey Community College (ARCC) natural area has three communities: prairie, successional old field, and oak woodlands. The objective was to determine the values of diversity of each community to understand the status of the natural area and the efficiency of current management practices. It was predicted that the prairie community would have a higher value of diversity than the successional old field and oak woodlands. Percent coverage was documented through species surveys, using randomized sampling plots. Shannon diversity, species evenness, and Simpson diversity index resulted in woodlands having the most diversity (Table 1). Bringing attention to the ARCC Natural Area is a start to increase funding for better land management practices of the prairie to further its diversity.
 12. Camryn Bliayang: [Evaluating White-tailed Deer \(*Odocoileus virginianus*\) Behavior using Camera Traps in the Blaine Wetland Sanctuary \(Blaine, MN, USA\)](#)¹
Faculty Mentor: Kristen Genet
White-tailed deer are keystone herbivores in their habitats and have been labeled as poorly misunderstood in a wetland habitat. Understanding white-tailed deer behavior in their habitats can initiate a response on the effects of the ecosystem. The location of this study took place in Blaine Wetland Sanctuary (BWS) in Blaine, Minnesota, which are wetland and upland habitats. This study hypothesized white-tailed deer detection is higher in uplands than wetland habitats for foraging and their detection of movement will be higher in wetlands than upland habitats. Camera traps (Bushnell Trophy Cam HD) were used in both habitats to capture five behaviors: Interacting, standing, eating, moving and resting. There was statistical difference in detection of white-tailed deer detection in upland than wetland habitats ($p = 0.01$) and statistical difference between male and female behavior of their usage of their habitats ($p = 0.01$). The results supported my hypothesis of white-tailed deer presence being higher in an upland habitat being accepted but rejected white-tailed deer movement in a wetland habitat being higher than an upland habitat.
 13. Aurora Erickson, Alyssa Beise and Austin Loher: [Analysis: Distribution of Smooth Brome in North America since 1877](#)¹
Faculty Mentor: Kristen Genet
Smooth Brome (*Bromus inermis*) is an invasive grass in North America that originated from Europe and Asia. The objective of this study is to understand how the distribution of Smooth Brome has changed over time and it is predicted that Smooth Brome will drastically spread throughout North America. Smooth Brome specimen records were sourced from iDigBio and cleaned before spatial mapping in QGIS (Quantum Geographic Information System). The records were spatially mapped to display the distribution in kilometers² over 20-year intervals from the

time of first recorded establishment. Our analysis found that Smooth Brome has invasive qualities, and there is a strong correlation between the passing of time and increased distribution of Smooth Brome ($R = 0.890$). Smooth Brome is shown to increase at an average rate of 65,737 kilometers every 20 years. Current methods of species eradication have not shown much success, and finding the best method of mitigation is the next step to maintain biodiversity in North America. [View the StoryMap Presentation Online](#)

14. Matt Olson, Annabel Inman, and Aaron Yund: [Distributional Change of *Alliaria petiolata* across North America from 1870 to 2021](#)¹

Faculty Mentor: Kristen Genet

The purpose of this research is to further understand the distribution of *Alliaria petiolata* (Garlic Mustard) across North America from its first documentation to present time (1870-2021). It is hypothesized its distribution will increase over time because Garlic Mustard is a strong competitor and uses allelopathic traits to hinder native species. The database iDigBio was used to obtain specimen records of Garlic Mustard, these specimen records were mapped using QGIS into 20-year intervals. A simple linear regression was used to show there was a positive correlation between time and distribution area of Garlic Mustard in North America. Garlic Mustard average area of distribution has expanded by 39,948 km² per year. If the current rate of expansion continues, Garlic Mustard is predicted by the trendline to cover 5,00000 km² by 2030. Possible reasons for the expansion of Garlic Mustard are increased technology to record data points and human globalization that could spread Garlic Mustard beyond native origins. Future studies can focus on the impact climate change has on the distribution of Garlic Mustard including temperature and precipitation. It is also notable to study the change human infrastructure has on the range and invasive abilities of Garlic Mustard. [View the StoryMap presentation for this project online](#)

15. Ibrahim Naser, Waleed Zaro, and Phillip Gronhovd: [P vs NP, the most important open problem in computer science.](#)¹

Faculty Mentor: Tristan Sprague Williams

Research project on the topic of P vs Np which is a famous unsolved problem in computer science. Introducing the topic, explaining it, and showing its importance

16. Ethan Raivala: [Looking for Endophytes from *in vitro* and Wild Type Duckweed \(Lemnoideae\)](#)¹

Faculty Mentor: Michael Wilson

Duckweeds are ecologically important aquatic flowering plants in the family Lemnoideae. They are peculiar among plants because their tissues are high in protein, making them an important food source for many animals. Legumes famously produce high-protein seeds and accomplish this by associating with bacteria capable of fixing nitrogen from the atmosphere. While duckweeds do not have any obvious special anatomical structures housing symbiotic bacteria like legumes, previous studies have found endophytic bacteria living in duckweed tissues. In this study we 1) extracted DNA from lab-strain and

wildtype duckweed tissue to determine if any bacteria were present using PCR amplification of the 16S rRNA gene and 2) cultured bacteria from duckweed tissue. Both duckweeds were positive for 16S rRNA genes and we were able to culture 19 different bacterial isolates, indicating the presence of bacteria in their tissues.

17. Julia Grabow: [Response of Northern White Cedars to Salinity Stress](#)¹

Faculty Mentor: Michael Wilson

Individual plants are naturally adapted to grow in a certain range of soil conditions, but human activity can change these conditions. Our deicing salt practices can increase soil salinity in roadsides, which is detrimental to plants living in these areas. High salinity inhibits plant growth and many plants take up excess salts from soil and accumulate them in their leaves. Northern white cedar (*Thuja occidentalis*) is a popular landscaping tree in Minnesota with a shallow root system, putting them at risk for salinity stress from deicing salts used on roadways. Leaves from northern white cedars were collected from 12 different sites around the greater Twin-Cities area. Leaves from 15 individual trees were samples from sites <30 m away from major roadways, with another 15 individual trees sampled from sites >30 m away from major roadways. Leaves were rinsed, dried, and then crushed to powder. Boiling water was used to extract powdered leaves and electrical conductivity (EC) used to measure leaf salt concentration. Overall, leaves sampled >30 m from major roadways had significantly lower EC compared to leaves sampled <30 m from major roadways ($p = 0.049$). However, we observed high EC variation within several sites, which included both presumably “low” and “high” saline sites.

18. Madison Oliver: [How Distance Affects Resin Choices for Native Solitary Bees](#)¹

Faculty Mentor: Michael Wilson

Different species of solitary bees will use a variety of materials to build their nests such as mud, leaves, and plant fibers. Some solitary bees specialize in using antimicrobial plant resins to build their nests, and we suspect this is a purposeful adaptation based on what we know about resin collection in honey bees. While we know some species of solitary bees use resin in Minnesota, we do not understand how distance affects resin use in solitary bees. Many solitary bees populations are in severe decline, therefore it’s important we understand what resources these bees need in their environment. We attached 21 trap nests to 7 different resin-producing plant species and observed solitary bee nesting for 35 days in summer 2022. We found that nesting varied considerably by week, with 16 resin nests out of 32 total nests appearing in our trap-nests. Trap nests attached to white pine (5 nests) and white spruce (6 nests) produced the most resin nests. When comparing the chemical composition of resin nests and resins sampled directly from trees, it did seem like solitary bees foraged resin from the plant species their trap-nest was attached to; however, sample sizes were limited.

19. Panhavuth Tan: [Resin Preferences of Solitary Bees](#)¹

Faculty Mentor: Michael Wilson

Resins are chemically-complex antimicrobial secretions produced by a variety of plant species in different

plant families. Resins from different plants are chemically very different, making them different substances for different purposes. Honey bees show distinct preferences for specific resins when given choice in their environments, and solitary bees might do the same. Rearing solitary bees in captivity is a major challenge in performing controlled preference experiments, and there are no well-defined rearing methods for these species. We tested several methods to rear *Megachile companulae* from trap-nest blocks after overwintering, and performed preliminary resin choice experiments in laboratory-controlled conditions. Resin-foraging occurred most frequently in the late afternoon. When offered resins from 5 different species simultaneously, *M. companulae* visited all resin offerings. Different individual bees varied greatly in their resin visitations, with some individuals showing strong preferences and others not. We also observed fighting between individual bees trying to collect from the same resin offering, which has also been observed in stingless bees.

AFA Portfolio Exhibition - Emergent Journeys

All artwork is displayed in the Upper Atrium of the Visual Arts Building

20. Yulitza Nava Gonzalez: [Emergent Journey](#)³

Faculty Mentor: Rachel Breen

Creating art for others is very inspiring to me. I enjoy how others view my artworks and have their own perspective on it. For example, I can view an art piece differently than another person based on my own thoughts and feelings while seeing it. I like to work with oil paint because of its thick qualities. I also enjoy photography and working with oil pastels. My work revolves around landscapes and sceneries. These concepts are important to me, because I want to capture the moment for viewers to enjoy. I would also want my viewers to experience what I'm trying to express through their own perspective, thoughts, and feelings. The emotions that I convey when creating my artwork are calmness, reflectiveness, and passion. Overall, I hope to continue to create many art pieces for the world to view, and to challenge myself by creating art in other different mediums.

21. Kathleen Deloye: Emergent Journey³

Faculty Mentor: Rachel Breen

I like to experiment with different mediums. Although pencil and paper have been my main medium for years, I have been expanding my horizons and like what I've tried. I never thought I'd be interested in making three-dimensional art but the more I learn about it the more I want to make it. Glass is the newest and personal favorite in my three-dimensional exploration. Using the bits of colored glass to manipulate the designs on glass work is why I love the experimentation. I also find it exciting how you can never truly see how the colored glass will come out until it is completely cooled. Even with my two-dimensional work, I like experimenting with colors. Bright colors draw me into making art -- they give off a happy feeling, unlike dull or muted colors. Bright colors seem to reflect how I feel when making my artwork. Although dull palettes can be more down-to-earth, brighter palettes are more uplifting and convey a 'life of the party' feeling.

22. Nora Johnson: Emergent Journey³

Faculty Mentor: Rachel Breen

I use pencils and pens, paints, and charcoal, because the feeling of physically drawing something, moving my wrist across the paper to create a line feels, like I imagine dancing feels to a ballerina. The lines of the human body are full of motion and grace, I express that movement, energy, or the stillness in-between movements through drawing. I draw people because they are exciting to me, always expressing emotion whether it is joy, sorrow, or boredom, their faces especially are always telling a story. Their physical 'imperfections' are often the most intriguing. Wrinkles around the eyes and mouth tell a story about that person, often their least favorite feature is what makes them unique. As I draw or paint a portrait of a person, the marks I make are writing a story of who they are. Edgar Degas said, "Art is not what you see, but what you make others see." When someone looks at my work, I want them to see not just what the model looks like, but the inner person, their story, their struggles, and victories. Sometimes this is expressed in their posture, the lines of their neck and the angle of their chin. Sometimes in the movement of their hands, the flick of their wrist and slope of their shoulders.

23. Allison Kubesh: Emergent Journey³

Faculty Mentor: Rachel Breen

When it comes to creating content through art, what I like to do is let the image do the talking. Art is very subjective and can differ from person to person so unless I make it very explicit or obvious, the works are up for interpretation. In painting, especially for me, the most I wish is to make pieces for others to look at and come up with their own conclusions, allow the ambiguity of it to have viewers look and make their own assumptions. What I create comes from my mind and could be interpreted differently by others.

24. Zachary Riemermann: Emergent Journey³

Faculty Mentor: Aaron Dysart

I am most interested in playing with the relationship between control and looseness in my work. While I still enjoy defined borders between colors and shapes, I have been freeing up other aspects of my work. For example, contrasting sharp angles and much more loose patterns. I've found that detailed patterns in relatively tight spaces help emphasize the differences in that dichotomy. I work often with paint, because it can have a feeling of looseness while still having enough control to work slowly and get as much detail as I want. I also enjoy colored pencils because of how much you can control and detail small areas on the page, with the added benefit of having even more saturation in the color of the work. I've been so interested in control and looseness in part because I naturally skew towards perfectionism and letting go of that drive is difficult. When I do tend towards looseness, it references a true to life perspective of how defined borders appear in the real world. I'm not sure how to strike this balance consistently yet, but it's something that feels vital and worth the effort.

25. Sarah Stojevich: Emergent Journey³

Faculty Mentors: Aaron Dysart and Rachel Breen

I have chosen to share this body of work with you because it represents the heart of me as an individual and as a multi-disciplinary artist. My natural tendencies are to depict what I see down to the smallest of

details, but lately I have been loosening up, becoming less fussy, and trusting the process. I enjoy using graphite for its ability to sharpen fine details, and charcoal for its blendability and quality of line with its edge. Soft pastels have become my favorite two-dimensional media. I enjoy the texture of the marks that can be made on different surfaces and the smoothness of the powder when you draw your fingers through it. When I can touch the media and work it with my hands, my artwork becomes loose and expressive. I love the process of casting bronze and working the surface of the metal with various tools. Though the machinery can be quite loud, there is a certain meditative quality to it when I put my earplugs in and it's just my thoughts mixed with the clanging. The use of color is important to me, and I use it very intentionally. I am exploring how different colors feel when they are together. I am interested in the dynamic of emotions that may be experienced when observing the interplay between light and dark values and the theme of duality. My most compelling work seeks connection with the viewer through vulnerability and storytelling.

26. Jessica Lundquist: Emergent Journey³

Faculty Mentor: Rick Schneider

My work explores the relationship between familiarity and curiosity. I want my audience to recognize my subject matter but also ask "why is this important?" The answer to this question is up to the viewer to interpret, whether it is a still life, or something more. I see most of my inspiration in my favorite things such as nature, and dreams. The natural characteristics in my paintings and drawings involve plants, landscapes, fruit or a place I have photographed. I envisioned a recurring childhood dream, in order to create my wall drawing *Unnamed*. It was a fascinating topic to interpret because dreams are a curious thing humans experience. My more advanced work has landed in shades of black, white, gray, or muted tones of charcoal and watercolor. The two are important materials to me in order to create crispness and softer visuals. These mediums have opened my eyes to understanding how to take away from a piece while simultaneously adding detail, but I don't consider myself limited to this. My work is evolving and will continue to do so as I incorporate more materials and explore endless ideas.

27. Hope Kingsley: Emergent Journey³

Faculty Mentor: Jennifer Nevitt

Home [hohm] *noun* : a house, apartment, or other shelter that is the usual residence of a person, family, or household. What is home to you? What makes a house, an apartment, or any other living space, into a significant place a person might call home? Through the process of working on this body of work, I was able to enjoy the ordinary things in my life that make up my concept of home. I used oil paint and photographs to capture my observations in these different scenes, taking time to notice how the space felt and translating that into my work. I played with the temperature of my colors to capture how light interacted with space. I tested the amount of information that was necessary to make objects and spaces feel familiar to a viewer while adding personal detail to the areas that held meaning to me. What I found in the process of making these works was that *connection* is what makes a house, a location, or even a person, home. Every person makes connections with places and things every day, and these bonds are what create significant places in our lives. I hope through viewing this work, you take time out of your life, to recognize the ordinary things that become your concept of home.

28. Annalee Kranz: Emergent Journey³

Faculty Mentor: Catherine Davis

The stories these images tell are specific to me in my mind, but, with the lack of insight *into* my mind, they are a mystery to a viewer, leaving them to fill in the blanks. I draw to create stories. There is so much that goes on inside my head, mixing themes and aesthetics with people, place, personality, and speech to create a cohesive image that reveals a scene to the viewer. In this exhibition I play with the viewer and create havoc and confusion, leaving questions unanswered and curiosity aroused. Like watching a movie scene without context of the full story. My preferred medium is pencil and ink, along with colored pencil to bring the scene to life. My second choice would be digital, as the tools and textures are many and the choices are endless. Active, loose line work together with bold, bright color to create an emotionally gripping image is what I create and how I go about it.

29. Julia Schulz: Emergent Journey³

My work comes from my inner demons and intrusive thoughts of my personal gripes with stress and anxiety. I want my audience to view my pieces with the intent to figure out what Insecurity I am trying to portray. These pieces portray what it's like being under pressure, which sometimes feels like a rope around the neck. Three of my pieces tell a story of my fragility as a human, like a porcelain vase. A piece that represents my struggle of being forced to hide my true self. My art showcases that sometimes disturbingly beautiful thoughts inside of people, are those that most want to pretend they don't have. Carefully chosen color palettes, concepts, and variety of media are used to express these insecure feelings. Each piece has a different concept yet they are tied into how my insecurities affect me.

Poster Presentations

Posters 30-46 will be displayed during the in person poster session on Wednesday, April 26 on the Rapids Campus.

Posters 47-70 are available on Symposium for the Virtual Poster Session

30. Jordan Arevalo: *Pestalotiopsis microspora* in Bioremediation¹

Faculty Mentor: Melanie Melendrez-Vallard

Pestalotiopsis microspora is an endophytic fungus found in the Amazon Rainforest. It's able to degrade polyurethane in both aerobic and anaerobic environments via a serine hydrolase. Using this microorganism in the bioremediation of plastic pollution found aquatically and terrestrially in Ecuador due to its degrading capabilities would be helpful in the fight against plastic pollution. As the enzyme breaks polymers of plastic into smaller monomers, biomass will be produced. As time goes on plastic pollution is breaking into smaller pieces; microplastics. The impacts of microplastics are in early phases of research, as time goes on more information regarding human health complications will be available. Microplastics have already started trophic transfer, being found in animals as well as tap water. Using a fungi to degrade plastic is an environmentally friendly way to remediate the damages already done. Plans to grow *Pestalotiopsis microspora* and research its most productive environment as well as how it will most effectively degrade plastics is needed. Investing in *Pestalotiopsis microspora* is investing in an expansive opportunity for generations to come.

31. Jordan Arevalo, Emily Hattling, Morgan Schindel, and Cassie Betz: Differences in *Pieris rapae* Apex Melanization Between Sexes and Seasons in Europe.¹

Faculty Mentor: Kristen Genet

This study was conducted to compare the apex melanization in *Pieris rapae* between sexes in Spring and Summer in Europe. It was hypothesized that for butterflies located in Europe, females will have more melanized wings than males and there will be seasonal dimorphism present. The images for this study were obtained using an Integrated Digitized Biocollections website. Images of the *Pieris rapae* located in Europe that fit the measuring criteria were then measured using an imaging processing program.

Analysis of the data showed that there is a statistical difference in apex melanization across seasons in *Pieris rapae*. The data also showed that females overall have more apex melanization than males.

32. Leah Beise: RAMP1 is a prognostic factor in Colorectal cancer and may cooperate with CFTR to promote aggressive phenotypes¹

Faculty Mentor: Paula Croonquist

The cystic fibrosis transmembrane conductance regulator (CFTR) is an ATP-gated ion channel that maintains a healthy balance of salt and water in a cell¹. Loss of function mutations in this gene can result in cystic fibrosis (CF)². Patients with CF have a higher chance of colorectal cancer incidence³. Loss of function mutations or low expression levels of CFTR have been shown to be correlated with poor survival rates. Furthermore, CFTR has recently been reported as a prognostic factor in colon cancer. A study revealed that loss of CFTR expression was linked to invasion and metastatic growth¹. Our preliminary data utilizing the Xena Patient Database helped us identify a list of statistically significant upregulated and downregulated genes (2-fold change as a threshold) in CFTR negative colorectal carcinoma patients compared to those with CFTR expression. Our preliminary analysis on differential gene expression between CFTR-negative and CFTR-positive patients shows that 18 genes are overexpressed and 113 downregulated in CFTR-negative patients. RAMP1 was within the top 5 most upregulated genes. We hypothesized that the RAMP1 gene may behave as an oncogene in colorectal carcinoma as it is dysregulated in other cancers such as prostate, gastric and breast but nothing has yet been reported in colorectal carcinoma. However, nothing has yet been reported in colorectal carcinoma. RAMP1 transports the calcitonin gene-related peptide type 1 receptor (CALCRL) to the plasma membrane. Our goal is to confirm that RAMP1 is overexpressed in colorectal carcinoma cell lines on which the CFTR locus has been targeted by CRISPR/Cas9 resulting in no CFTR expression. We aim to understand the molecular mechanism by which RAMP1 may be cooperating with loss of CFTR to promote proliferation, invasion and metastasis in colorectal cancer. Our experimental design included bioinformatic analysis to investigate RAMP1 as a prognostic factor for colon cancer, Western blotting to confirm protein overexpression and knockdown of the RAMP1 protein by siRNA followed by a MTT Proliferation Assay. Kaplan Meier analysis utilizing the Xena platform showed that RAMP1 is prognostic in colorectal cancer ($p < 0.03$). We are in the process of confirming overexpression of RAMP1 protein and siRNA transfections in T84 colorectal cancer cell lines without CFTR expression (4C8 and IC3).

33. Lindsay Bronstad, Isabella Grotberg, Carley Whittaker, Sylvia Gitamo, and Madison Linder. The Effects of Latitude on *Pieris rapae* Wing Spot and Apex Melanization¹

Faculty Mentor: Kristen Genet

This experiment was carried out to explore the relationship between the latitude and melanization of *Pieris rapae*. Butterflies were accessed with online resources and measured with downloadable applications. To analyze the data, a scatter plot was made, and a trendline showed that the latitude and melanization of *Pieris rapae* were inversely proportional. In other words, as latitude increases, melanization decreases. This data supported our hypothesis that latitude has a negative impact on wing apex and spots.

34. Sylvia Gitamo, Luke Johnson, Nadia Pobuda, Josiah Bonin, Clairice Skeate, Abinaya Anandaraj: Characterization and Mapping of mutant B.4.1 in *Drosophila melanogaster*¹

Faculty Mentor: Paula Croonquist

One of the hallmarks of human cancer is abnormal cell growth as a result of dysregulation of the cell cycle. In order to identify novel genes that may drive the formation of tumors, an EMS mutagenesis screen was conducted in *D. melanogaster* and mutant flies with interesting growth phenotypes selected and bred to a deficiency kit to map the unknown mutation by complementation. In addition, mitotic recombination was used through the FLP-FRT system in order to uncover the mutant phenotype just in the eye. We found that B.4.1 mutant eye phenotype had an overgrowth of pigmented cells when compared to the control mosaic eye suggesting that the mutation may be disrupting the cell cycle controlling gene. We crossed the B.4.1 mutant flies to over 50 chromosome 2R deficiency stocks and found deficiencies BDSC 8931 and 9062 which failed to complement indicating that mutation is within those overlapping chromosomal regions. We carried fine mapping on the chromosomal overlap of deficiencies BDSC 8931 and 9062 and were able to narrow down the putative mutation location to a chromosomal region with eleven genes. After isolation of fly genomic DNA, primer design, PCR and gel electrophoresis of four candidate genes within the region, sequencing data of those genes identified all a premature stop codon on gene CG1603 (exon 1, residue 32). We are in the process of validating these results. If this mutation is confirmed, we may have identified the function of a novel gene. Future directions will involve naming this gene and further characterizing its function.

35. Grace Harper: *Mycobacterium vaccae* and its Potential for Treatment of Mental Health Conditions¹

Faculty Mentor: Melanie Melendrez-Vallard

Mycobacterium vaccae shows potential in anti-inflammatory, serotonergic system regulation, and stress-resilience properties. This could be used to treat anxiety, depression, and compulsive disorders, among others. The two main areas of research are on a lipid-derived from *M. vaccae* & *M. vaccae*-inoculated soil. Its effects are not fully understood on a molecular level, and this area of study needs to be furthered in research, and application. There is still much to be understood about this microbe.

36. Carissa Manthie, Lauren Bailey, Emma Krause, Abinaya Anandaraj: Influence of Sex and Season on the Wing Melanization of *Pieris rapae* in North America¹

Faculty Mentor: Kristen Genet

butterflies, are an invasive species to North America. They are known to undergo sexual dimorphism in their wing patterns. Females tend to have two eyespots, while

males only have one. In this study we sought out to find if season and sex can affect *Pieris rapae* wing melanization/pattern in a significant way. It was hypothesized that sex and season would have a significant effect on melanization. To conduct this study, we used ImageJ to analyze images of different butterflies. These measurements were added to a database that contained multiple measurements of butterflies from all over the world. Using these measurements, a comparison of sex and season as independent variables against wing melanization/pattern was conducted. The findings showed that females tend to have a greater melanization compared to males. Butterflies that were found in summer have a higher wing melanization than butterflies that were found in the spring, with average melanizations of 0.549 and 0.753 in the summer, and 0.427 and 0.537 in the spring. Further studies could be conducted to find the why behind the correlation of sex and season to melanization.

37. Brooklyn Dickey, Angela Fife, and Carissa Smith: Seasonal Effects on Elephant Numbers in Gorongosa National Park¹

Faculty Mentor: Kristen Genet

Our study investigated the effect seasons had on the number of elephants in Gorongosa National Park (GNP). We used 8 years of Wildcam trap data to determine how many elephants were in GNP each season. We counted the total number of elephants in each of the 4 seasons (Dry, Dry-Wet, Wet-Dry, Wet) and took the average of that number. The Dry season has the most, followed by Dry-Wet, Wet-Dry, and lastly the Wet season. We can say that elephants tend to be seen more in GNP during the Dry season.

38. Julia Gunderson: Gorongosa Undergraduate Research Project¹

Faculty Mentor: Kristen Genet

During our experiment we investigated how the number of baboons was affected by time of day. Our hypothesis was supported but our prediction was not. From our data we concluded there are the highest baboon numbers during the hours of dusk and dawn. This will impact how we study baboons in the future.

39. Alaina Payne, Abigail Macedo, Alyssa Metter, and Egeree Gemta. Seasons Effect on elephant population in Gorongosa National Park¹

Faculty Mentor: Kristen Genet

For this project, the independent variable is the season. The dependent variable is the number of elephants, as this is the variable that will change depending on the conditions of the independent variable. How does the season affect the population of elephants? This research project will be initiated with the prediction that the elephants will be more numerous during the wet season, as this is the season that will have the most resources available to these mammals.

40. Jacob Polnaszek, Monica Swinney, Thomas Ford, and Mia Satre: Elephants in Vegetation Communities¹

Faculty Mentor: Kristen Genet

community supports the most Elephants. We used camera trap pictures from the Zooniverse classify website that was already gathered. We found that elephants were most photographed in the Floodplain Grassland. Our conclusion was that either food or water was more abundant in this area, and it could support the most Elephants.

41. Trinity Johnson: Precipitation in State Forests¹

Faculty Mentor: Joan McKearnan

Minnesota state forests are spontaneous when it comes to precipitation levels, however, these few years have had low rainfall for most forests. Battleground state forest after 2013 having a high of 1.57, the recent years have had a low precipitation. The current precipitation level is 0.33. the battleground has aspen, maple, oak, and balsam fir trees. and other deciduous trees. all of these species require heavy rainfall and humidity. Some forests have had contrasting results. An example is Big woods state forest. This forest has had high precipitation levels. tree roots have become flooded which has cost the loss of 12% of the forest's trees.

42. Lindsay Bronstad, Lauren Estepp, Grace Harper, and William Boyle: Fibrous Mycelium Mats as Absorbent Materials¹

Faculty Mentor: William Boyle

The development of absorbent materials for use in medical applications is crucial in producing wound dressings with improved water absorbency, antimicrobial qualities, and elasticity. Mycelium (mushroom extracellular matrix) possesses noteworthy attributes due to the biopolymers that constitute its structure. We hypothesized that lyophilization of base-treated mycelium fibers would yield a strong, low-density cryogel-like material. The mycelium was grown on potato dextrose agar (PDA) plates until uniform mats formed. The mats were treated with concentrations of NaOH varying from 0.05% to 0.15%. After base treatment and washing, the samples were lyophilized to generate a cryogel-like material. To assess the impact of culture conditions on fiber properties, the standard PDA growth conditions were compared to agar modified with additives (corn husk, orange oil, silver nanoparticles, and silver nitrate). Examination of the physical properties of the mats using tensile and water absorption testing was used to assess their potential as wound dressings. Modifying the growth conditions with additives did not result in significant differences in material strength or water absorption when compared to the control. The mycelium samples that underwent 0.05% base treatment endured more stress before breaking when compared to the 0.10% and 0.15% treatments. Lyophilization dramatically improved water absorption and strength compared to air-drying. This study demonstrates that cultivated mycelium with cryogel-production methods exhibit increased porosity and absorbency; qualities that can simulate and accelerate wound healing.

43. Trinity May, Carissa Manthie, and Merna Shaaban: Analysis of Cyclin G Conservation across *Drosophila* Species¹

Faculty Mentor: Paula Croonquist

insulin/insulin-like signaling pathway(IIS) works with the TOR signaling pathway to regulate growth, metabolism, and aging. Cyclin G plays an important role in these pathways by binding PP2A-Akt1. In *Drosophila*, flies that have a mutant Cyclin G gene tend to have a reduced body weight and show signs of starvation. Human cyclin proteins have also been found dysregulated in cancer tissues. Prior evidence has demonstrated that genes' position and connectivity in the IT signaling pathway affect their selective constraint, with upstream proteins evolving faster than downstream counterparts and more connected ones under higher selective constraint. In order to better understand the Cyclin G gene structure, as well as its role in the insulin/TOR pathway, we investigated orthology and conservation of Cyclin G across different *Drosophila* species. Using the Genomics Education Partnership (GEP) pipeline, the putative

ortholog of Cyclin G in *D. hydei*, *D. erecta*, and *D. elegans* were annotated. It was hypothesized that protein conservation would decrease with phylogenetic distance. The protein alignments and dot plots were obtained and analyzed. The Cyclin G protein had the highest percent identity in *D. erecta*, and it was least conserved in *D. hydei*. Interestingly, exon one showed the least conservation across the three target species. Future studies should include more target species to understand the evolution of the Cyclin G gene.

44. Claylan Mounthachak, Emily Hattling, Cassie Betz, Hoang Phat Nguyen: Identification and Annotation of the Putative Orthologs of the Pi3K21B Gene in *D. yakuba*, *D. obscura*, *D. rhopaloa*, and *D. serrata*¹
 Faculty Mentor: Paula Croonquist

The Insulin/Tor signaling pathway is required for the cellular import of glucose and its metabolism. It is critical for cell growth, fat and protein metabolism, and longevity. Its dysregulation in humans plays a major role in type II Diabetes, cardiovascular disease, and cancer. The PI3K protein kinase is made up of two subunits, a catalytic subunit and a regulatory subunit, and its main function is to phosphorylate phosphoinositol-4,5-bisphosphate (PIP2) to produce phosphoinositol-3,4,5-trisphosphate (PIP3). The product of PI3K, PIP3, acts as a cellular second messenger and binds to AKT as well as to other signaling proteins, triggering many cellular events including mTOR activation which leads to cell proliferation and tumor growth. Ponce et al showed that position in the IT signaling pathway and number of protein-protein interactions (connectivity) affect selective constraint. We hypothesized that Pi3K21B conservation will decrease with phylogenetic distance with the protein being least conserved in *D. obscura* and most conserved in *D. yakuba*. Nevertheless, Pi3K21B selective constraint may not decrease as much as other proteins based on its high connectivity (hub). We utilized the UCSC Genome Browser, Flybase, BLAST, Gene Record Finder and Gene Model Checker developed by GEP to annotate the putative orthologs of Pi3K21B in four target species using *D. melanogaster* as our reference species. Our preliminary data indicates that our hypothesis may be supported with *D. obscura* Pi3K21B protein identity (63.8% and 69.2%) being lower than in *D. yakuba* (96.6% and 97%).

45. April Ost: Cross-Species Gene Annotation of *D. melanogaster* Cftr Uncovers Gene Duplication¹
 Faculty Mentor: Paula Croonquist

Dysregulation of the cystic fibrosis transmembrane conductance regulator (CFTR) gene has been found to be associated with colorectal cancer (CRC), as it seems that Cftr may act as a tumor suppressor gene. CFTR research can help elucidate how these interactions are connected, with the *Drosophila* genus being

Following Cftr orthology with the Genomics Education Partnership (GEP) pipeline led to extensive comparative models across four target species: *D.elegans*, *D.miranda*, *D.hydei*, and *D.grimshawi*. These results included synteny diagrams, dot plots, custom gene models, and graphed span alignment similarity percentages. The main discoveries were 4-fold; Cftr diverged as the phylogenetic tree would suggest, the most divergence happened at exon 3, *D.miranda*'s third and fourth exon merged, and the furthest two species (*D.hydei* and *D.grimshawi*) have close, co-functional Cftr gene duplications.

46. Leyla Sengul: Turkey: Throughout the Ages²

Faculty Mentor: Jennifer Sonterre

A country with global connections, a deep history that intertwines with a multitude of different cultures and countries, and a population of 85 million. The Republic of Turkey has seen many different fates, the

powerful and the defeated, but always continues to be relevant. This presentation is a look at Turkiye throughout the ages, noting several major events, politically and economically, as well as various cultural revelations. Starting from the beginning of the Ottoman Empire and ending in modern day Turkiye, this presentation is a reflection on the important characters and movements that have happened in the move from dynasty to nation.

47. Katherine Schultz: Impact of Storage Method on Vitamin C Content in Pineapple¹

Faculty Mentor: Heather Sklenicka, Rochester Community and Technical College

Vitamin C is an essential nutrient that plays a major role in supporting cellular health and the immune system. Vitamin C can be supplemented through either a daily diet or dietary supplements. For those who get their Vitamin C primarily from their diet, how food is stored plays a significant role in how much Vitamin C is available once you are ready to eat it. The purpose of this study was to examine the effect of various storage conditions (room temperature, refrigerated, frozen, and canned) on the concentration of vitamin C in sample servings of pineapple over time and determine which method should be recommended when purchasing and storing pineapple. Vitamin C (L-ascorbic acid) was measured through titration of the pineapple sample with potassium iodate using a potassium iodide and starch indicator. Through this method, the mass of vitamin C in the sample along with the percent recommended daily allowance (RDA) in a serving was calculated. Across trials, it was found that frozen outperformed refrigerated, canned, and room temperature storage conditions in terms of Vitamin C concentration and retention.

48. Madison Blomberg, Karli Guth, and Austn Loher: Differences in wing melanization of *Pieris rapae* in Europe and North America¹

Faculty Mentor: Kristen Genet

In this experiment, we analyzed butterfly data that had been recorded in both Europe and North America and compared the apex melanization and anterior wing spot melanization on the butterfly species known as *Pieris rapae*. We tried to determine if the difference in temperature on the two continents is correlated with a difference in melanization on both the apex and anterior wing spots. Our hypothesis in this experiment was that higher temperatures would be correlated with higher melanization on both the apex wingtip and anterior wing spots. We analyzed average melanization levels

that North American butterflies had more melanization in the apex wingtip than European butterflies. However, the melanization on the anterior wing spots was greater in Europe than it was in North America, meaning only the apex wingtip melanization was correlated with higher temperatures.

49. Amelia Determan, Mya Mochinski, Trinity May, Olumedi Olusesi: Wing spot and apex melanization of *Pieris rapae* in different latitudes¹

Faculty Mentor: Kristen Genet

Pieris rapae is a widespread butterfly that is found in many diverse types of environments. To survive they must adapt to their environment which is done by phenotypic plasticity of the wing spots and apex melanization. Solar absorption and solar reflectance are processes that allow for thermoregulation. Therefore, it is believed that in higher latitudes the wing spot pattern and apex melanization will be darker, or more heavily melanized. Images of 758 *Pieris rapae* butterflies were collected from the iDigBio database and were measured using ImageJ software. The wing area, wing spot pattern, and apex

melanization were measured on the dorsal forewings. Statistical significance was found for the left apex patch melanization and for the relative left and right anterior spot. However, the correlation between these variables and latitude were found to be extremely low. The relationship between all the other variables and latitude were not statistically significant and had low correlations. Additional variables like ventral hindwing and abdominal melanization or basking posture and size could have affected these results and should be studied further.

50. Clairice Skeate, Tenzin Jampa, Ashlee Bishop, Ibrahim Adan, Makida Abdela: Apex Melanization of *Pieris rapae* in Europe during the Spring and Summer¹

Faculty Mentor: Kristen Genet

Pieris rapae, commonly known as the white cabbage butterfly, is a well-known pest that is worldwide and thriving. Our study compares seasonal wing apex melanization to determine if temperature changes play a role in the size and intensity of the *Pieris rapae* butterflies apex wing melanization. Initially, we had predicted that apex melanization in the *Pieris rapae* would be larger in the spring seasons. However, through analysis of *Pieris rapae* using specimen records and ImageJ, we came to the result that wing apex melanization is larger and more intense in the summer rather than in the spring. This is due to the amount of solar radiation that the butterfly is exposed to throughout its development. Which ultimately rejects our initial hypothesis.

51. Marie Anderson: Annotation of chico and foxos orthologs in *Drosophila* species¹

Faculty Mentor: Paula Croonquist

The Insulin/Tor (IT) pathway is a crucial signaling pathway responsible for metabolism and glucose uptake, and has influence on longevity, fat/protein metabolism, and cell growth. Inaccurate regulation of this multi-functional pathway plays a key role in many well known human diseases, from diabetes to cancer. Chico a gene involved in the IT pathway encodes for a substrate responsible for positive regulation of the insulin receptor (InR) binding activity. Past research on network architecture has found that a genes constraint level is affected by its connectivity and position in the pathway. Ponce et. al showed that IT pathway genes closer to the membrane evolve faster than downstream counterparts. We

hypothesized that, due to its involvement in

the crucial IT pathway, chico orthologs are conserved in the target species *D. elegans*, *D. ficusphila*, *D. miranda*, and *D. hydei*, and their protein identities would decrease according to phylogenetic distance from the reference species *D. melanogaster*. However, we predicted that chico selective constraint will be weaker than other pathway elements (i.e. foxo) because of its upstream position. Chico putative orthologs were annotated in all four target species and modeled with tools from the Genomics Education Partnership (GEP) pipeline, including the UCSC Genome Browser, tBlastn and Blastp searches, the Gene Record Finder, and the Gene Model Checker. The target species protein alignments were examined, roughly spanning 45%-80% similarity to the reference species. *D. ficusphilas* CHICO protein identity percent was lower than that of FOXO, supporting our hypothesis that position in the pathway is inversely related to selective constraint. Additional species genomes have been recently added to the GEP pipeline. Future studies across those genomes will strengthen our findings.

52. Emma Brotemarkle, Nearyroth Men, Rhiannan Armerud: Annotation of the foxo gene from *D. melanogaster* in *D. bipectinata*, *D. ficusphila*, and *D. rhopaloo*¹
 Faculty Mentor: Paula Croonquist

Insulin is a major contributor in regulating many functions within Drosophila. Insulin is a major contributor in regulating the function of metabolism of both lipids and carbohydrates through the insulin/TOR signaling pathway in drosophila. The goal of this study was to find which species was the most and least conserved. To complete this study, the gene foxo putative orthologs were annotated in three species of drosophila, *D. rhopaloo*, *D. bipectinata* and *D. ficusphila*, utilizing programs such as the GEP UCSC Genome Browser, Gene Record finder, Gene Model Checker, NCBI BLAST and FlyBase. It was hypothesized that *D. bipectinata* would be the most conserved and *D. rhopaloo* would be the least conserved due to their locations on the phylogenetic tree. Results showed *D. rhopaloo* was the most conserved and *D. bipectinata* was the least conserved. This can be concluded based on the dot plots of each species. *D. bipectinata* had the most gaps having the least similarity to *D. melanogaster* and *D. rhopaloo* had the least amount of gaps having the most similarity to *D. melanogaster*.

53. Cynthia Benson and Lorena Slipka: The Time of Day Affects the Abundance of Elephants¹
 Faculty Mentor: Kristen Genet
 Gorongosa National Park is home to diverse kinds of animals including elephants. During the first aerial wildlife survey led by Dr. Kenneth in 1969, 2,200 elephants were recorded. Over the years, this number has changed. Our study aimed to show that there is an abundance of elephants in GNP during the daytime. We have used the data from the number of elephants captured by the camera traps set in various areas of the park which aimed to record activities or presence of animals. Since time of day has different lengths, an average method was used to compare the average number of elephants versus time of day. Data from 2012-2019 were considered in this study. The result showed that there are abundance of elephants during dusk and dawn compared to daytime and nightfall.
54. Jennifer Christensen, Makenna Anderson: Gorongosa Undergrad Research Project - Elephants and Vegetation Type¹
 Faculty Mentor: Kristen Genet

National Park. We collected data from camera traps to determine if the change in vegetation type affected the number of elephants in a given area. We predicted that more elephants would be found in the mixed savanna and woodland vegetation, but our research showed that elephants were more abundant in the floodplain grasslands. The collected data can help future research find the best conservation plans for elephants by examining what vegetation areas to focus their efforts on.

55. Taylor Henry, Austin Ramert, Antonio Candia: Impala Activity is Influenced by the Time of Day¹
Faculty Mentor: Kristen Genet

In the study, impalas in the Gorongosa National Park were reviewed over a period of several years. The hypothesis was that the time of day would affect the abundance of impala seen on trail cams. In the results it was found that impala are seen most during the dusk hours.

56. Jordyn Hirte, Olivia Aho, Hannah Day, Logal Kiel, Jonathan Guerrero: Vegetation Community Type's Influence on Elephant Location¹

Faculty Mentor: Kristen Genet

Gorongosa National Park, located in central Mozambique, Africa, has been a national park for over 60 years (1). There are four distinct vegetation community types within the park: mixed savanna and woodland, limestone gorge, floodplain grassland, and miombo woodland. We aimed to study how these

four vegetation community types of Gorongosa National Park affect the number of elephants caught on camera. The data we are studying was collected through camera traps set up amongst the park, by research teams and they allowed us, and many other researchers, to explore the abundance of elephants in different areas and vegetation communities of the park. Our findings of the most elephant-dense

community type being the Floodplain Grassland, and the least being the Miombo Woodland, suggest that due to their enormous size, elephants need open spaces and large access to vegetation.

57. Tara Lancaster, Mariah Humble, Andrew Groth, and Teyba Mohamed: Elephant Sightings in Gorongosa During a Certain Time of Day¹

Faculty Mentor: Kristen Genet

Our goal studying the camera traps in Gorongosa was to observe whether the time of day affected the number of elephants photographed. Our Hypothesis was that the time of day would impact the number of elephants captured on camera traps. Then our prediction was that dawn would be the time of day where the most elephants were recorded.

58. Mariah LeMire, Patrick Schroepfer, Amanda Mueller: Vegetation Community Type Influence on Warthog Population¹

Faculty Mentor: Kristen Genet

This study focuses on warthog population and the correlation with that of vegetation community types in Gorongosa National Park. Warthogs are herbivores and mainly feed on grasses and other types of vegetation, and in mixed savanna and woodland, and floodplain grasslands, they can find an abundance of vegetation to feed on. These findings provide insight into the ecological factors that influence warthog

preserving and managing the habitats that support these populations.

59. Connor McDevitt, Angela Taylor, Hailey Syvock, lilen Gillespie: Waterbuck Population Throughout the Season at Gorongosa National Park¹

Faculty Mentor: Kristen Genet

Species at Gorongosa National are always changing during the seasons. Research has been done to suggest that the species at Gorongosa have more activity in certain times of the year. Kristin Henderson talks about how camera trap research provides the parks, their visitors and the animals that live in these places reap the benefits of this powerful tool. This project focuses on testing which season at Gorongosa has the highest population of Waterbucks. This project found data for different seasons (independent variable) to see how many waterbucks (dependent variable) were populating the area at that time. The hypothesis was that the Wet seasons total. would yield the highest average of Waterbucks The experiment revealed dry and wet Oct-Dec to have the highest populations amounts.

60. Ashlee Onstad, Belen Rubio, Nick Capps, Jalon Johnson: How Seasons Affect Duiker Populations in Gorongosa National Park¹

Faculty Mentor: Kristen Genet

Our hypothesis states that seasons affect the number of duikers around the park. It is predicted that the dry season from July to September will have more duiker. The reasoning behind this is during the dry season there is new vegetation to feed on and to hide from their predators.(1) It shows from July to September there's not a ton of rain. The habitat during this season is more ideal for duiker to thrive in.

Duiker are able to thrive in a variety of habitats including: forest and bush montane forests, and riverine forests.(5) Duikers live in moist savannahs to stay away from rainforests. (1) The data that was collected was obtained from the Gorongosa Wild Cam website. There are roughly 60 different camera traps located around the Gorongosa National park. These camera traps are battery-operated cameras that are strapped to trees. The data was collected by determining the amount of duiker in the photos during the seasons and year, then the average had been calculated for each. Excel was used to make the data tables of the photos that took place from 2012-2018. The common trend that was found is that the population of the Duiker in Park was the highest in the Dry seasons of Jul-Sep. & Dry/Wet from Oct-Dec. From the years 2013-2018.

61. Matthew Young, Patrick Wilson, Martha Garza, Courtney McCormick and Bayley Stoneking: Elephant Activity Vs. Time of Day¹

Faculty Mentor: Kristen Genet

We analyzed data collected from camera trap images of Elephants living in Gorongosa National Park located in Mozambique. We wanted to decipher what times of day they were most active and draw a conclusion about their motivation behind the patterns.

62. Aaron Davies: Poetry a Tool for Liberation and Expression²

Faculty Mentor: Jasmin Ziegler

Poetry is a way for individuals to express themselves. Allowing artistic liberty to channel personal endeavors and insights.

Faculty Mentor: Jasmin Ziegler

Power point presentation - describes the essence of poetry in an abstract mindset, discusses what it is beyond just the written words

64. Sabreen Shaya: What Is Poetry? ²

Faculty Mentor: Jasmin Ziegler

I dip my toes into the art of poetry to discover what poetry is through my first unit in ENGL 2208 - Poetry.

65. Kyle Buyukuysal: [Thanksgiving Bingo at Senior Facility](#)²

Faculty Mentor: Mo Janzen

For my Introduction to Ethics class, I planned and organized a special Thanksgiving-themed Bingo at a local senior facility. I gathered information, reached out to community facilities, communicated and planned with a senior living facility coordinator, designed and distributed fliers, shopped for prizes and snacks, and finally led the Bingo activity. I hosted this event to lessen seniors' loneliness, especially during the holidays. I chose this group because seniors are often marginalized and are given less importance in society. Overall, this activity was an amazing experience because I gained skills such as communication and detailed planning. The staff were appreciative, and the seniors enjoyed the unique prizes, decorations, and snacks along with some fresh faces at the facility.

66. Manny Flicek, Carmen Bechtle, Badger Johnson, Dylan Modina and Iris Valladolid: Effects of Reinforcement and Rewards on Students²

Faculty Mentor: Ann Pelzel

What effects are present when children receive social reinforcement and tangible rewards? We wanted to answer this question because we found it interesting and there were not many studies asking

this question. We believed that social reinforcement and tangible rewards would mainly affect children positively, so that became our hypothesis. Our method would consist of going to many schools and having the teachers give the social reinforcements and tangible rewards. Then record the reactions of the students which we would then use to publish our main findings.

67. Shayleen Jacobson, Shelbie Paulson, Emma Hurd, Ashleigh Reilly, and Ryan Blake: Blue Light vs. Sleep Quality in Adolescents and Young Adults²

Faculty Mentor: Ann Pelzel

How does blue-light exposure (independent variable) affect college students' sleep quality (dependent variable)? It affects the amount of sleep we get, which connects to our sleep quality. As humans, we need sleep. According to the National Heart, Lung, and Blood Institute (2022), [i]n children and teens, sleep... helps support growth and development. It can also affect how well you think, react, work, learn, and get along with others, which can be detrimental in educational, personal, and work environments. Humans require a decent sleep quality to complete their day effectively, which explains the importance of this study. Pieters (2014) states, 'excessive use of technology is one of the most prevalent factors contributing to sleep deprivation in adolescents.' Sleep deprivation occurs because of the blue light emitted from these devices. Blue light can cause a decrease in sleep quality and quantity, as shown in a study by Geerdink, et al. (2016). If college students reduce their exposure to blue light while in bed, then

study, we used a survey with a sample size of five college students. The data collected was then analyzed through graphing and comparing individuals' sleepiness (thematic analysis). Our results show that our hypothesis was partially correct, and the lack of blue light before sleep improved the quality of sleep and daytime energy.

68. Bilal Mohamed, Tina Tran, and Trevor Buchanen: The Turing Machine

Faculty Mentor: Tristan Sprague Williams

All about the Turing Machine. It's history, how it work's, and it's significance.

69. Paula Croonquist: Genomics Education Partnership Supports Research Opportunities for Students and Faculty at Community Colleges¹

Faculty Presentation

The Genomics Education Partnership (GEP, <https://thegep.org/>), a consortium of over 200 diverse colleges and universities, has provided a supportive framework for integrating genomics research into the undergraduate curricula since 2006. GEP provides professional development for faculty, organizes data collection and analysis for genomics projects, coordinates the development and maintenance of the curriculum, and provides access to virtual teaching assistants to support student participation in research. Students participate in GEP research either through faculty-mentored experiences outside of class or through course-based undergraduate research experience (CURE). To broaden participation, GEP recently expanded recruitment to community colleges (CC). Genomics research, that requires only a computer with internet access, may be especially suitable to 2-year institutions limited by minimal research capacity and budgetary constraints. Multiple challenges for engaging students in research at CCs have been previously identified. To understand how GEP functions to support student research at CCs, we analyzed student and faculty outcomes. We analyzed student learning gains after engaging in a GEP project utilizing a pre/post quiz and self-reported gains in science understanding and science skills using the SURE survey (Lopatto, 2004, 2007). Student outcomes were measured with 11 additional items related to thriving in science, developed based on commonly used questions (Schreiner, 2013). We found that CC student outcomes are positive and comparable to non-CC students, with gains in knowledge, attitudes toward science, and thriving in science. To understand how

faculty experience the GEP community, we conducted a survey that was developed based on the published study of other communities of practice in STEM education (Kezar and Gehrke, 2015). While the number of GEP CC faculty responding to the survey was small (16 out of 124 respondents), the response rate for CC faculty and non-CC faculty was comparable (64% and 60% response). The factors motivating participation and self-reported professional gains for faculty at the community colleges were similar to those of faculty at other schools. Our early findings suggest that the GEP model, integrating centralized support with flexible CURE implementation and a supportive community of practice, has benefits for CC students and faculty. We have created a supportive community of faculty and welcome new colleagues (no experience necessary!) eager for the challenge of bringing genomics research to all undergraduate students (freshmen through seniors), especially at the community colleges, HBCUs, and

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70. Christopher McCarthy: [The Millimeter Anthology of Student Essays](#)²

Faculty Presentation

“You write in order to change the world. If you alter, even by a millimeter, the way people look at reality, then you can change it.” James Baldwin

With this quote at the top of my syllabus, I gave the students in my College Writing and Critical Reading course a challenge: Over the next sixteen weeks, you will practice brainstorming, drafting, revising, and editing your essays. And, in the end, you will publish your writing online for our college community and the world to read. To persevere, you must believe in yourself. You belong here. You are an invaluable member of this community, and this is your opportunity to raise your voice. It will be hard and you will doubt yourself, but you’re going to write anyway. You matter. Which means your writing matters. Let’s use it to make the world a better place, even if it’s just by a millimeter. The following collection of essays is their attempt to meet this challenge. Be aware: Students have the right to remain anonymous. Many chose this while others left their names on their work. I have not edited these essays. They represent the spectrum of perspectives and stages of academic development among the students in our course. You will find MLA and APA formats. Copying and pasting from these essays or reproducing them in any way without proper citation is considered plagiarism. Please read with an open mind and a critical eye. Thank you!