# ISCAP

## INDEPENDENT SCHOLARSHIP & CREATIVE ACTIVITIES PRESENTATIONS

RIDER UNIVERSITY

MAY 5, 2021

# ISCAP Day

**Wednesday, May 5, 2021**

**Online via Zoom**

**10:00 AM – 3:15 PM**

## Schedule At-A-Glance:

| | | |
|---|---|---|
| **10:00-12:00** | **Undergraduate Research Scholar Awards Session** | **Zoom link** |
| **12:00-1:15** | **Lunch Break** | |
| **1:15-2:15** | **Poster Session** | **Zoom link** |
| **2:15-3:15** | **Panel Sessions (concurrent):** | |
| | Panel 1: | **Zoom link** |
| | Panel 2: | **Zoom link** |

**Planned by the URSA Committee:**

Phillip Lowrey, Chair
Devon Baranek
Jay Carter
Hee Young Kim
Bhesh Mainali
Adam McMahon
Jane Rosenbaum
Kelly Ross
Yoshinori Tanokura
Sharon Whitfield

RIDER UNIVERSITY

**Office of the President**
2083 Lawrenceville Road
Lawrenceville, NJ 08648-3099
T 609-896-5001
F 609-895-5681
rider.edu

May 5, 2021

Dear Students, Scholars, Faculty and Families,

Today the Rider University community will hear about the remarkable scholarship, research, and creative endeavors of our students as they apply their college education in innovative ways. To those students who are presenting their work today, I extend congratulations on your achievements. To all those who supported these students in their academic adventures, I offer appreciation and thanks. These activities exemplify the many valuable opportunities and resources students enjoy at Rider to enrich their learning experience. Frankly, our students could not have done their work without you.

Special congratulations to this year's Undergraduate Research and Scholarship Award winners. These students proposed detailed independent projects to be carried out in the following academic year and will each receive a $5,000 tuition scholarship. You will hear about the wide variety of projects they will be undertaking in the awards session later this afternoon.

Whether you conducted research or helped to make it happen, your efforts send a strong message about the academic excellence students can achieve at Rider.

Congratulations to everyone involved!

Sincerely,

Gregory G. Dell'Omo, Ph.D.
President

Office of Provost and
Vice President for Academic Affairs
2083 Lawrenceville Road
Lawrenceville, New Jersey 08648
T 609-896-5010
F 609-896-5242
dfredeen@rider.edu
www.rider.edu

May 5, 2021

Dear Students, Faculty, and Family Members,

Today is a full day dedicated to honoring and showcasing the creative works and research of Rider University students in collaboration with their faculty mentors. Each year, the Undergraduate Research Scholar Awards (URSA) Committee hosts ISCAP (Independent Scholarship & Creative Activities Presentation) Day in an effort to display student originality and contributions to their fields of interest. ISCAP Day is also meant as a forum for members of the Rider community—both faculty and students—to come together in an interdisciplinary dialogue focused on students' creative projects.

Another very important purpose for ISCAP Day is to announce the new URSA scholarship recipients, as well as to hear about the progress made among last year's URSA award winners on their year-long projects. This portion of the day is particularly important as we honor some of the most gifted undergraduates at Rider. We congratulate you on your outstanding accomplishment.

Please join us as we celebrate these student achievements and honor their creative works.

Congratulations on a job well done!

Sincerely,

DonnaJean A. Fredeen
Provost and Vice President for Academic Affairs

# Undergraduate Research Scholar Awards Session

**via Zoom link**

**10:00 AM – 12:00 PM**

**Chair:** Phil Lowrey (Biology, Behavioral Neuroscience and Health Sciences)

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|---|---|
| **10:00** | **Welcome by Provost DonnaJean Fredeen** |
| | **Announcement of 2020-21 URSA Recipients** |
| 10:15-10:30 | **Khawar Ahmed** (Computer Science)<br>*Classifying M Giants Using Machine Learning Techniques* (Advisor: **Dr. John Bochanski**) |
| 10:30-10:45 | **O Aung** (Biology)<br>*Effects of Time-Restricted Feeding During the Early and Late Inactive Period of a High-Fat Diet on Glucose Tolerance in Male C57BL/6J Mice* (Advisor: **Dr. Todd Weber**) |
| 10:45-11:00 | **Dylan Erdelyi** (Musical Theatre)<br>*Immersive Theatre Through the Lens of Social Psychology* (Advisors: **Prof. Miriam Mills, Dr. Wendy Heath**) |
| 11:00-11:15 | **Danielle Jackson** (History and Filmmaking)<br>*A Two Front War: The Fight for Civil Rights by African American World War Veterans* (Advisor: **Dr. Shawn Kildea**) |
| 11:15-11:30 | **Carissa Moore** (Environmental Science)<br>*Evaluating the Reliability of Plantower Sensors* (Advisors: **Dr. Daniel Druckenbrod, Dr. Joshua Stratton**) |
| | **Announcement of 2021-22 URSA Recipients** |
| 11:30-12:00 | **Niamh Cashin** (Exercise Science)<br>*A Correlation Between Exercise Intensity, Conditioning, Frequency and the Related Psychoactive Effects* (Advisor: **Dr. John Guers**) |
| | **Natalie Critchfield** (Criminal Justice and Sociology)<br>*The Structural Impact of a Pandemic on Crime Patterns - An Analysis of Drug and Domestic Violence Arrests in the City of Newark* (Advisor: **Prof. James Wojtowicz**) |
| | **Madison Doran** (Biology)<br>*Understanding the Roll of Toll-like Receptor 4 in the Body's Innate Immune Response* (Advisor: **Dr. James Riggs**) |
| | **Carly O'Sullivan** (Biology)<br>*Immunological Characterization of the MyD88 Knockout Mouse and the Effect of the Tumor Microenvironment* (Advisor: **Dr. James Riggs**) |
| | **Joshua Stein** (Psychology and Musical Theatre)<br>*The Effects of Arts Experiences on Wellness in College Students* (Advisor: **Dr. Wendy Heath**) |

# Poster Session

**via Zoom link, 1:15 PM – 2:15 PM**

**Chair:** Devon Baranek (Accounting)

1. **Taner Bay** (Biochemistry); Advisor: **Dr. James Riggs**
   *Immunological Characterization of the TLR5 Knockout Mouse*

2. **Cassia Bornkamp** (Health Science); Advisor: **Dr. John Guers**
   *The Magnitude and Duration of Analgesia Following Acute Exercise*

3. **Paris Boucher** (Health Science); Advisor: **Dr. John Guers**
   *Acute Cardiovascular Response to Cell Phone Use in College Students*

4. **Jillian Chan** (Health Science); Advisor: **Dr. John Guers**
   *Difference in Heart Rate and Blood Pressure Variability Between Symptomatic vs Asymptomatic Students Previously Infected with COVID-19*

5. **Oliva de la Torre Coca** (Biochemistry); Advisor: **Dr. Danielle Jacobs**
   *Optimization of Choline Geranate Derivatives as Antibacterial Agents*

6. **Jenna Dean** (Elementary Education and Multidisc. Studies); Advisor: **Dr. Susan Doherty**
   *How the COVID-19 Pandemic Has Shaped Our Teaching Practices*

7. **Jessica Homitz** (Athletic Leadership); Advisor: **Dr. John Guers**
   *The Analgesic and Psychoactive Effects of Exercise are Related to Exercise Frequency but Not Exercise Capacity*

8. **Andrew Ingling** (Human Resource Management & Organizational Psychology); Advisor: **Dr. Helen Sullivan**
   *Impulse Control in Young Adults*

9. **Lauren Langa** (Music-Vocal Pedagogy); Advisor**: Dr. Kathy Price**
   *Making the Private Voice Studio Your Career: A Survey of Logistics and Structure, Primarily within the Public School System*

10. **Marissa Murdock** (Marine Science); Advisor: **Dr. Gabriela Smalley**
    *Seasonal Variation in the Phytoplankton Biomass, Nutrients, and Other Water Quality Parameters in Centennial Lake, Lawrenceville, New Jersey*

11. **Grant Nabit** (Health Science); Advisor: **Dr. James Riggs**
    *Immunobiology of Mice Lacking CD44, a Surface Protein*

12. **Emily Paterson** (Biochemistry); Advisor: **Dr. Michael Feigin**

*Inhibiting Cleavage and Polyadenylation Specificity Factor 3 (CPSF3) for the Treatment of Pancreatic Ductal Adenocarcinoma (PDAC)*

**13. Jordan Wilson** (Marine Science); Advisor: **Dr. Gabriela Smalley**
*Effect of Benzalkonium Chloride on Natural Plankton Assemblages in Centennial Lake, Lawrenceville, New Jersey*

**14. Sarah Winzinger** (Psychology and Political Science); Advisor: **Dr. Elaine Scorpio**
*Effects of Death Anxiety on COVID-19 Health-Related Prosocial Behavior Cooperation*

**15. Benjamin Woodward** (Environmental Science); Advisor: **Dr. Kerrie Sendall**
*Rider Woods Understory Restoration: Deer Deterrent Methods for Native Wildflower Species*

# Panel Session 1:

**via Zoom link**

**2:15 PM – 3:15 PM**

**Chair:** Hee Young Kim (Management)

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|---|---|
| 2:15-2:30 | **Jessica Kardasz** (Psychology) and **Dominique White** (Psychology)<br>*Children's Tool Learning Using Virtual Object Demonstrations*<br>Advisor: **Dr. Cara DiYanni** |
| 2:30-2:45 | **Tiana Bradham** (English-Writing)<br>*Uncovering the Melting Pot: How Forced Hybridity Traumatized a Nation of Marginalized Cultures*<br>Advisor: **Dr. Kelly Ross** |
| 2:45-3:00 | **Wakako Kawasaki** (Voice Pedagogy and Performance)<br>*Differences of Vowels in Speaking and Singing as Evidence Between First and Second Generations of Japanese-Americans*<br>Advisor: **Dr. Kathy Price** |
| | |

# Panel Session 2:

**via Zoom link**

**2:15 PM- 3:15 PM**

**Chair:** Sharon Whitfield (Moore Library)

| | |
|---|---|
| 2:15-2:30 | **Rebecca Green** (Health Science)<br>*Examining Side Effects and Emotional Blunting for Antidepressants*<br>Advisor: **Dr. Cara DiYanni** |
| 2:30-2:45 | **Brittany Cook** (Health Science)<br>*Remote Learning Attenuates Physical Activity and Sleep Quality*<br>Advisor: **Dr. Sophie Green** |
| 2:45-3:00 | **Marco Michanowicz** (Environmental Science)<br>*Sustainable Construction of Rider's Big Woods*<br>Advisor: **Dr. Daniel Druckenbrod** |
| | |

# PROJECT ABSTRACTS

**PSTR** = Poster Session
**PNL** = Panel Session
**URSA** = URSA Session

## Ahmed, Khawar

*Classifying M Giants Using Machine Learning Techniques*

We will use Machine Learning (ML) techniques to identify and accurately classify M Giants in the *Gaia* second data release. The data used for training will be either provided through the synthetic survey of a simulation of the Milky Way, or from data already in hand. By classifying the M Giants, we will have a better idea of the structure of our Galaxy at large distances. In addition, we will be highlighting the power of ML algorithms, which will be more important as astronomy continues to produce new, large surveys of billions of stars and galaxies. (**Dr. John Bochanski**) **URSA 2020-2021**

## Aung, O

*Effects of Time-Restricted Feeding During the Early and Late Inactive Period of a High-Fat Diet on Glucose Tolerance in Male C57BL/6J Mice*

Current research in the field has identified health effects such as obesity and type 2 diabetes that are triggered due to a high-fat diet. In an attempt to alleviate these health effects, individuals have started to utilize time-restricted diets and intermittent fasting into their daily routines. Primary literature shows that a high-fat diet shifted eating patterns into the inactive period of mice which may contribute to weight gain. In our experiment, we will be examining C57BL/6J mice to observe their glucose tolerance when subjected to food restriction early in the day compared to late in the day. (**Dr. Todd Weber**) **URSA 2020-2021**

## Bay, Taner

*Immunological Characterization of the TLR5 Knockout Mouse*

Toll-like receptor 5 (TLR5) is a cell surface molecule associated with cells of the innate immune system, particularly those in proximity to the gut mucosa. TLR5 detects flagellin, the major protein comprising the flagella (“tails”) of bacteria. Most current TLR5 research focuses on organized lymphoid tissue; its function in the peritoneal cavity (PerC), a cavity enriched with innate immune cells, has not been investigated. We have been comparing the immunobiology of normal (“wild type”) mice with those lacking, or “knocked out” for, TLR5 (TLR5 KO). Flow cytometry analyses revealed an increase in B1 B cells and a decrease in B2 B cells in the spleen of TLR5 KO mice. Surprisingly, no differences were seen between PerC B cells of TLR5 KO and wildtype mice. T cell analyses revealed a decrease in CD4+ helper T cells of the TLR5 KO spleen; in the PerC, a decrease in CD8+ killer T cells was observed coinciding with a decrease in activated killer T cells. All spleen cell analyses revealed decreased amounts of macrophages relative to wildtype mice. These differences in the immune cells of TLR5 KO mice invite further research of their immunobiology to advance understanding of the role of TLR5. (**Dr. James Riggs**) **PSTR**

## Bornkamp, Cassia

*The Magnitude and Duration of Analgesia Following Acute Exercise*

Exercise (EX) causes analgesia but the EX prescription necessary to elicit the effect and the duration of the effect following EX is unknown. **PURPOSE**: To determine the duration of EX induced analgesia. **METHODS**: Ten subjects (age = 20.1 ± 3.1 yrs) underwent 30 minutes of moderate intensity cycling.

Following EX, subjects remained seated for 15 mins. Oxygen consumption ($VO_2$) was measured throughout the experiment. Minimal pain threshold (MPT) was measured on the forearm at baseline (BSL) 0min, 5min, and 15-mins post EX. MPT was quantified using a Student's T-Test. The effect of sex on MPT over time was quantified using a 2 x 2 ANOVA. Data are shown as mean ± SEM. **RESULTS**: MPT was greater at 0min post-EX (53.3 ± 5.5 N) vs. BSL (31.8 ± 6.1 N; $p<0.05$). Females had a greater increase in MPT (29.6 ± 3 ΔN) vs. males (15.7 ± 8.6 ΔN; $p<0.05$). MPT remained higher at 5mins (48 ± 6.3 N) and 15mins (44.4 ± 5.7 N) post-EX. Sex differences in MPT remained up to 15mins ($p<0.05$). **CONCLUSION**: Moderate EX increased analgesia for 15 minutes following EX. (**Dr. John Guers**) **PSTR**

## Boucher, Paris

*Acute Cardiovascular Response to Cell Phone Use in College Students*

Recent studies suggest college aged students average 8-10 hours of screen time per day. Despite this we do not fully understand the physiological implications that these behaviors can have on our bodies. **Purpose:** To examine changes in the cardiovascular response in college aged subjects with and without access to their cellphones. **Methods:** Subjects (3 men and 2 women; age=20.4±1.3 yrs) sat through two 20-minute trials, one with their cellphone and one without any access to their phone. Further, our subjects did not have any communication with our testers during these sessions. Oxygen consumption, electrocardiography (EKG) and blood pressure (BP) were monitored. BP was measured every two minutes while EKG and oxygen consumption were measured continuously. A paired T-test was used to determine differences in the data between trials. Data is shown as mean±SE. **Results:** Subjects reported spending 8.4±1.5hrs/day of screen time. HR increased by 23±2.1BPM ($p<0.05$) and mean arterial pressure rose 11.2±4.4mmHg ($p<0.05$) during sessions with phone vs. no phone. Lastly, respiratory rate remained unchanged between conditions.**Conclusion:** Cellphone use appears to increase both BP and HR, which is perhaps indicative of a stress response. (**Dr. John Guers**) **PSTR**

## Bradham, Tiana

*Uncovering the Melting Pot: How Forced Hybridity Traumatized a Nation of Marginalized Cultures*

The tales of minorities such as Pocahontas and Anzaldúa who have been forced to abandon their native culture and assimilate into Euro-American society is common in American history and has been an intrinsic theme in many examples post-colonial American literature, such as Nella Larsen's "Passing", all of which will be explored in the following essay. In addition, this essay will examine how America has forced hybridity on pre-established cultures to not only fabricate the nation's history, but to also solidify itself as a nation founded on the belief of white supremacy, the superiority of Euro-American culture, and racial differences. This method of forced unionization and forced hybridity only resulted in an already diverse nation growing more divided. Traumatizing those who were forced to abandon their cultures and adopt Euro-American customs, ideas, and social behaviors. However, to change one's countenance and mannerism does not change their identity. This point will be further expounded on in the following composition after analyzing the experiences of Pocahontas, Anzaldúa, and Larsen's characters Irene and Clare, after being affected by oppressive British and Euro-American societies. (**Dr. Kelly Ross**) **PNL**

## Cashin, Niamh

*A Correlation Between Exercise Intensity, Conditioning, Frequency and the Related Psychoactive Effects*

Exercise has psychoactive characteristics which can lead to exercise induced analgesia and addiction to exercise and our preliminary data support these findings. Despite some evidence that exercise

improves mood state and can blunt pain it is an underutilized treatment option. A proper "dose" of exercise has not yet been established. Our preliminary data along with some past studies have pointed to the fact higher intensity exercise may be more beneficial when the aim is to elicit a dopaminergic response. We hypothesize that high intensity exercise will attenuate acute pain and enhance mood to a greater extent than lower intensity exercise. (**Dr. John Guers**) **URSA 2021-2022**

## Chan, Jillian

*Difference in Heart Rate and Blood Pressure Variability Between Symptomatic vs Asymptomatic Students Previously Infected with COVID-19*

The physiological implications of past COVID-19 infections are still unknown. Further, it is also unclear if there will be a difference in long-term outcome in symptomatic vs. asymptomatic individuals. **Purpose:** To examine if there is a difference in cardiovascular function during exercise (EX) between asymptomatic and symptomatic college students who were previously infected with COVID-19. **Methods:** Subjects, females=6; males=1) performed submaximal EX. During EX, blood pressure was recorded every 2 minutes and EKG was recorded continuously. Subjects filled out a questionnaire before performing EX to determine if they were asymptomatic (AS) or symptomatic (S), and if S, what symptoms they experienced. A student's t-test was used to determine statistical differences between groups. Data are shown as mean±SEM. **Results:** There were no differences between HR (BPM) or mean arterial pressures (MAP) between groups($p>0.05$). However, heart rate variability (HRV; AS =155.5±6.7ms vs. S=77.7±10.9ms; $p<0.05$) and blood pressure variability (BPV; AS=13±1.1 mmHg vs. S=5±1.0mmHgl $p<0.05$) were different. **Conclusion:** There was a significant difference in HRV and BPV between A and S subjects indicating that experiencing symptoms associated with COVID-19 may impact the autonomic nervous system. **(Dr. John Guers**) **PSTR**

## Cook, Brittany

*Remote Learning Attenuates Physical Activity and Sleep Quality*

Prior to remote learning students commuted to class as a form of physical activity (PA). In addition to attenuating PA, remote learning could augment screen time (ST). Increased ST has been linked to changes in sleep quality (SQ). The purpose of this study is to investigate the effects of remote learning on daily PA and SQ. We hypothesize PA and SQ will decrease during remote learning. Students answered two questionnaires, Global Physical Activity Questionnaire and Pittsburgh Sleep Quality Index. Questionnaires were answered twice, before remote (pre), and during(post), and estimated daily ST. 42% of participants were freshmen, 75% of participants were female, average age was 19 (+/- 2.3), 77% of students were full time remote and 23% hybrid. Daily ST on the computer (hours) increased during remote learning (preST=1.5 +/-1.1, vs. postST=7 +/- 0.76), phone and television ST were unchanged. SQ, defined as the number of students getting great or poor sleep, decreased. For those who were exercising prior to the start of the semester, there was a decrease in minutes per week during the semester, and an overall decrease in PA. Future studies are needed to compare SQ and PA with in person classes. (**Dr. Sophie Green**) **PNL**

## Critchfield, Natalie

*The Structural Impact of a Pandemic on Crime Patterns - An Analysis of Drug and Domestic Violence Arrests in the City of Newark*

Criminology suggests theories to help explain the causes of crime in society. Structural theories of crime attribute criminal likelihood on characteristics of a geographic region regardless of who lives and/or interacts there. This research will examine the impact of the COVID-19 pandemic on the structural patterns of drug crimes and domestic violence (DV) in the City of Newark. By mapping drug and DV arrests for the two years prior to the start of the health emergency in March 2020 as well as

the arrests through March 2021, the structural patterns can be compared to identify any significant pattern changes. (**Prof. James Wojtowicz**) **URSA 2021-2022**

## de la Torre Coca, Oliva

*Optimization of Choline Geranate Derivatives as Antibacterial Agents*

Previous researchers at Rider University have noted that while the deep eutectic solvent (DES) choline geranate (CAGE) is an effective antibacterial agent against gram negative bacteria it is not effective against gram positive bacteria. In order to increase its effectiveness against gram positive bacteria they synthesized many CAGE DES derivatives, two of which were extremely effective against gram positive bacteria. However, they were unable to confirm the true structure of these molecules. During this semester, I have been working in the lab with a senior from Rider. The main objective or our project have been (1) to prepare/synthesize pure geranic acid, and (2) the synthesis of the precursor choline chloride derivatives, ultimately with an overall aim to (3) test the unique deep eutectic solvents and other similar salt formulations for their antibiotic activity via minimum inhibitory concentration analysis. Even though these are the main objectives, as of right now, geranic acid has been synthesized, but it is still trying to be fully purified. The choline chloride derivatives are currently being performed, which will be done by the end of April. The end of this research semester will consist on try to finally purify the geranic acid and have choline chloride derivatives ready in order to use them on the project. (**Dr. Danielle Jacobs**) **PSTR**

## Dean, Jenna

*How the COVID-19 Pandemic Has Shaped Our Teaching Practices*

The onset of COVID-19 in late 2019 disrupted many aspects of our lives, including education. This paper examines how COVID-19 affected teaching practices. Data collection involved the distribution of two Google Form surveys to primary school educators living and teaching in the United States, Australia, and France. The survey questions were designed to collect demographic information, information about the transition to remote learning, the routines established for remote teaching, and the transition into to face-to-face/hybrid/remote learning for the new school year. The results showed that the pandemic has changed the ways participants are educating their students. This shift has obligated teachers to utilize more technology in their classroom, some of which they have not been trained to properly use, and overall continue on their school year with access to less resources than usual. While continuing to educate classrooms with a full roster of students, participants have continued to juggle concerns regarding dependents at home and their own personal health and safety, all while feeling less than positive about the teaching profession. The following paper delves into background information regarding the Coronavirus pandemic, the effect past pandemics have had on schools, and the data collected through the two questionnaires. (**Dr. Susan Dougherty**) **PSTR**

## Doran, Madison

*Understanding the Roll of Toll-like Receptor 4 in the Body's Innate Immune Response*

The goal of these studies is to better understand the role of toll-like receptor 4 (TLR4) in the body's innate immune response. Specifically, this research will investigate the importance of TLR4 in the peritoneal cavity, and compare this information to prior experiments involving TLR4 in the spleen and lymph nodes. Both TLR4 knockout mice (TLR4 -/-) and wild type mice will be studied in this experiment. Flow cytometry and Cell Trace CFSE will be used to detect immune cells and observe cell division. It is expected that TLR4 will play a vital role in immune regulation in the peritoneal cavity. (**Dr. James Riggs**) **URSA 2021-2022**

## Erdelyi, Dylan

*Immersive Theatre Through the Lens of Social Psychology*

Immersive theatre is a historically prevalent, yet, in its present form, rarely attempted genre that is considered to be on the theatrical fringe. Immersive theatre offers the connection of the audience to the actors and environment through the exclusion of the "fourth wall," or conceptual barrier between actor and audience. This project explores the implications of changing the nature of the audience-actor interaction in this genre. Rather than just presenting a performance, this project seeks to add a second dimension through social psychological research, using observational data and surveys to evaluate the experiential impact of immersive theatre. (**Prof. Miriam Mills, Dr. Wendy Heath**) **URSA 2020-2021**

## Green, Rebecca

*Examining Side Effects and Emotional Blunting for Antidepressants*

This study examined the differences between side-effects and emotional blunting in those currently taking an antidepressant versus those not taking one. It was predicted that the incidence of each side-effect would be significantly greater for those currently taking an antidepressant, and that the side-effects would decrease with time taking the medication. It was also expected that the degree of emotional blunting would be significantly greater for those currently taking an antidepressant than for the other two groups, and that emotional blunting would decrease over time. The data for this study was from a 45-question survey that was successfully completed by 256 participants. The survey questions asked about demographic information, side-effects experienced, and the degree of emotional blunting experienced by the participants. Results revealed a significant difference in the rates of side-effects among the three groups, as well as a significant difference in emotional blunting scores among the three groups. These results suggest that those with experience taking an antidepressant either currently or previously experience significantly worse side-effects and emotional blunting than those who have never taken one. (**Dr. Cara DiYanni**) **PNL**

## Homitz, Jessica

*The Analgesic and Psychoactive Effects of Exercise are Related to Exercise Frequency but Not Exercise Capacity*

The EX-related dopaminergic release can increase analgesia and euphoria. Individual variation in dopaminergic signaling may be responsible for differences in EX compliance. **Purpose:** To examine if higher EX capacity ($VO_{2max}$) or time performing weekly EX correlates to EX analgesia and self-perceived mood. **Methods:** Subjects (6 women and 2 men; age = 21.1±0.6 yrs) were tested for maximal aerobic capacity ($VO_{2max}$) and then brought back to bike at 65% of $VO_{2max}$. Subjects filled out an EX frequency questionnaire and a Psychoactive Effects Questionnaire (PEQ), that assesses subjective dopaminergic effects, and a minimal pain threshold (MPT) was performed on the forearm before and after EX. Pearson's correlation was used to evaluate any relationships. Data are shown as mean±SEM. **Results:** EX at 65% of $VO_{2max}$ increased MPT by 59.2±4.1% ($p<0.05$) and PEQ by 103.4±5.1% ($p<0.01$). MPT ($r=0.51$; $p=0.20$) or PEQ ($r=0.21$; $p=0.67$) had no relationship to $VO_{2max}$. MPT ($r=0.82$; $p=0.01$) and PEQ ($r=0.71$; $p=0.002$) were related to EX frequency. **Conclusion:** Increased EX frequency is related to EX analgesia and improved mood state, independent of EX capacity. (**Dr. John Guers**) **PSTR**

## Ingling, Andrew

*Impulse Control in Young Adults*

This pilot study is looking at performance on a short-term memory task. The measurement of accuracy, affected by stimulus length, and presence or absence of a co-occurring diverting video, will

be analyzed. This is an online experiment that will gather demographic data, experimental data, and survey information related to the traits associated with impulse control as seen in the experiment and in the day-to-day life of participants. One goal of this study is to expand on past research results of Short-Term Memory; the primacy and recency effect, (Morrison, et al., 2014) and (Murdock, 1962), as well as other research dealing with Delay of Gratification, Walter Michele (Michele, 1989), Angela Duckworth (Duckworth, 2019), Maria Korsnes (Korsnes, 1996). Bennet Murdock, and Alexandra Morrison, during the unusual time of COVID 19. (**Dr. Helen Sullivan**) **PSTR**

## Jackson, Danielle

*A Two Front War: The Fight for Civil Rights by African American World War Veterans*

This documentary film project will explore the postwar radicalization of African American World War veterans which led to a push for civil rights on the homefront. Upon their return, veterans were disrespected, abused, and lynched after having served their country in wartime. Studying the maltreatment of both First and Second World War African American veterans will allow for a more holistic understanding of the impetus for the Civil Rights Movement in America. Over the course of the academic year, I will advance from research to the three stages of production: pre-production, production, and post-production. Using scholarly works, interviews, and historical footage, which will be presented in a documentary film format, I will produce a film that explores the foundations of the Civil Rights Movement in the context of African American war veterans. (**Dr. Shawn Kildea**) **URSA 2020-2021**

## Kardasz, Jessica and Dominique White

*Children's Tool Learning Using Virtual Object Demonstrations*

This study examined how children aged 4-6-years old learn about tools and pass that information on to others. We aimed to understand how children imitate through virtual object demonstrations and if the use of "we" language convinces children to use an inefficient tool. In these demonstrations, children watched two videos of models completing two tasks, cookie-crushing and water-moving. The models in both cases used inefficient tools as well as either instrumental, "I'm going to move water" or conventional language, "We always do it this way". For the cookie-crushing task, the model used a fuzzy pom-pom, and in the water-moving task, the model used a flimsy square to scoop the water. After viewing the model, children were asked which tool they would need to complete the task, the inefficient or the efficient one. Following their response, children were asked what tool the model in the video used as a memory check. With the results of this pilot study, we plan on conducting a study which further investigates imitation through the use of objects with arbitrary actions and how children trust models after the use of an inefficient tool. (**Dr. Cara DiYanni**) **PNL**

## Kawasaki, Wakako

*Differences of Vowels in Speaking and Singing as Evidence Between First and Second Generations of Japanese-Americans*

To sing foreign songs with correct diction is not easy for Japanese singers. Although they work hard, it is obvious that their diction is different from native speakers. Many studies have attempted to research differences in English pronunciation among Japanese students and native English speakers. Some researchers, such as Ninomiya & Yahagi (2015), compared formant and resonance between students trained in Japan and others who studied abroad. Others, such as Enomoto (2002), Isono (2002), carried out investigations between trained Japanese English speakers and White native English speakers. However, little attention has been given to explore comparing the vowels among Japanese Americans. Some researchers, such as Hattori (1997), advocate that the body shape between

Caucasoid and Mongoloid influences the sounds. The aim of this research is to identify acoustic and mechanical differences in speech and singing pronunciation between two generations of Japanese Americans. All participants of this study were Japanese-Americans. Their parents and grandparents are also Japanese decedents. Five male participants of the first generation grew up in Japan, and the second generation spoke both English and Japanese fluently. Future studies may benefit from the research of acoustical data analyzed for pitch, frequency, and formant activity in Japanese singers' speaking and singing. (**Dr. Kathy Price**) **PNL**

## Langa, Lauren

*Making the Private Voice Studio Your Career: A Survey of Logistics and Structure, Primarily Within the Public School System*

The purpose of this study was to examine the systems set in place for a career in private voice teaching, with an emphasis on the efficacy of relationships between the private voice teacher and the Public School systems. Respondents of two different surveys, one for Public School teachers, both choral and theatre (N=23), and one for private voice teachers (N=23), answered questions about their students' demographic and economic profiles; teaching logistics concerning time, structure, and location; and financial considerations regarding both monetary transactions for voice lessons and talent-based scholarship for collegiate pursuits in music-related majors. Respondents answered questions pertaining to structures that existed prior to COVID-19. Results indicated that both private voice instruction (provided by the voice teacher) and class voice instruction (provided by the school) rendered similar results regarding college acceptance and talent-based scholarship for music programs. Furthermore, access to voice lessons through the Public School system, both financially and locationally, not only provided opportunities for a more diverse population of student, but also relieved demands on the Public School teacher while allowing educated voice teachers an opportunity to make a full-time private voice teaching career. In future research, exploration of several other facets could be helpful in surveying the career of voice teaching. Repertoire taught within the lesson, teachers' supplemental income beyond private voice instruction, lesson prices, and shifts in lesson structures post COVID-19 might continue to reveal the many varieties in which voice teachers conduct their careers. (**Dr. Kathy Price**) **PSTR**

## Michanowicz, Marco

*Sustainable Construction of Rider's Big Woods*

This project focuses on the process and benefits of making a trail in Rider University's Big Woods. As an extension of the work done by previous classes, including SUS-400 in Spring of 2020 and ENV-375 in Spring of 2018, we will use the information provided by their groups and combine this with the creation of the trail. To serve as my capstone project, this paper will be used as a record on steps taken to build sustainably, the academic and health benefits of a trail in nature, and lastly the importance of bringing the Rider community together with students, faculty, and staff. (**Dr. Daniel Druckenbrod**) **PNL**

## Moore, Carissa

*Evaluating the Reliability of Plantower Sensors*

The health impacts of air pollution have been tied to increased health impacts due to inhalation of particulate matter such as aggravated asthma to lung disease. Under the clean air act, both state and federal agencies monitor air quality nationally. Unfortunately, the cost of these stations is large, limiting spatial coverage within each individual state. This project aims to evaluate the Plantower sensors in hopes to bridge the gap of these expensive monitoring stations and their poor spatial coverage. Using low-cost sensors may be supplemental to national networks and provide individual

citizens with a reliable and robust means to assessing air quality. The sensors for this project were carefully built with the enclosure and other components specifically chosen and designed. These included the batteries, meteorology sensors, particulate matter sensors, the size, and the storage methods. Sensors were provided to several participants to evaluate the air quality around Rider University's campus. The data shows that the sensors are able to assess changes in concentration throughout the day. However, considerable calibration for accurate measurements suggests that low-cost sensors may present challenges for citizen science projects. The Plantower sensors demonstrated sufficient reliability for hotspot identification and rapid changes in particulate matter concentrations. (**Dr. Daniel Druckenbrod, Dr. Joshua Stratton**) **URSA 2020-2021**

## Murdock, Marissa

*Seasonal Variation in the Phytoplankton Biomass, Nutrients, and Other Water Quality Parameters in Centennial Lake, Lawrenceville, New Jersey*

Phytoplankton abundance can determine the health of lake and its ability to support a diverse ecosystem. Monitoring of phytoplankton biomass and abiotic factors such as nutrient availability, dissolved oxygen, turbidity, light availability, pH, and temperature in Centennial Lake on Rider University's campus in Lawrenceville, NJ has not been conducted since fall of 2017. As these parameters are variable with seasons data was collected during spring of 2021 to compare trends in phytoplankton biomass, abiotic factors, and planktonic community composition of the spring to trends observed during fall of 2017. Data was collected every Tuesday from February 23$^{rd}$ 2021 till April 13$^{th}$ 2021. Light intensity, dissolved oxygen, and temperature measurements were collected *in situ*. Three water samples were collected and brought back to lab to determine the chemical composition. Additional lake water was collected for chlorophyll filtration and collection of plankton samples. Data revealed that when chlorophyll α concentrations were high there was an increase in pH and the dissolved oxygen percentage was higher than 100. Seasonal variations between light availability and temperature were also noted. The seasonal variation of the phytoplankton biomass and abiotic factors suggests Centennial Lake's capacity to support a diverse ecosystem varies temporally. (**Dr. Gabriela Smalley**) **PSTR**

## Nabit, Grant

*Immunobiology of Mice Lacking CD44, a Surface Protein*

CD44 is a surface glycoprotein that is upregulated upon T cell activation. Current research surrounding CD44 shows this receptor's functions include lymphocyte differentiation, adhesion to the matrix, homing, activation, and apoptosis (5). Due to the function of the receptor in lymphocyte homing, it has received attention surrounding its role in cancer metastasis (8). The goal of our experiments is to determine the differences in lymphocyte subsets and activation between CD44-/- and wild-type (C57BL6/J) mice. In our experiments it was shown that CD44 deficient animals had altered B cell class switching, increased risk of the development of B-cell linked lymphomas, and hyperactive T cell responses. (**Dr. James Riggs**) **PSTR**

## O'Sullivan, Carly

*Immunological Characterization of the MyD88 Knockout Mouse and the Effect of the Tumor Microenvironment*

Several primitive recognition molecules exist within the immune system. These molecules respond to bacteria and other foreign material. For an immune response to be launched, these receptors must signal through a molecule called MyD88. The specific function of this molecule is not well understood, and has become a topic of interest in the field of immunology. The role MyD88 plays in the

immunological environment surrounding tumor cells is even less well understood, but could play a significant role in the treatment of cancers going forward. This proposal seeks to expand upon the knowledge of the function of the MyD88 molecule. (**Dr. James Riggs**) **URSA 2021-2022**

## Paterson, Emily

*Inhibiting Cleavage and Polyadenylation Specificity Factor 3 (CPSF3) for the Treatment of Pancreatic Ductal Adenocarcinoma (PDAC)*

Cleavage and polyadenylation specificity factor 3 (CPSF3) is part of the alternative polyadenylation (APA) complex and is the endonuclease that cleaves pre-mRNA. Where the pre-mRNA is cleaved determines the length of the 3' untranslated region as well as the function of the gene product. In many cancers, the expression of APA factors is dysregulated and APA has been shown to be commonly altered, driving expression of cancer-promoting genes. In pancreatic ductal adenocarcinoma (PDAC) in particular, we have shown that CPSF3, among other APA factors, is highly upregulated. Prior studies have shown that CPSF3 is the target for the anti-inflammatory drug JTE607. JTE607 has already shown effectiveness in cancers such as acute myeloid lymphoma (AML) and Ewing's sarcoma, however, it has yet to be tested on adenocarcinomas. In this study, we analyzed if CPSF3 is a viable target for treating PDAC using pharmacological and genetic approaches. We tested this hypothesis in PANC1 cells (a pancreatic cancer cell line) by knocking down CPSF3 or by treating cells with JTE607. We show that PANC1 cells are sensitive to JTE607 and that JTE607 decreases PDAC proliferation and colony formation and arrests cells at the S-phase of the cell cycle *in vitro*. We extend these findings by showing a similar phenotype when knocking down CPSF3. We therefore conclude that CPSF3 is an important target for PDAC treatment. (**Dr. Michael Feigin**) **PSTR**

## Stein, Joshua

*The Effects of Arts Experiences on Wellness in College Students*

Research shows that arts experiences can benefit wellness. Yet, many studies in this field are not well controlled, or test a very specific population (e.g., patients with certain diagnoses). The purpose of the proposed experiment is to investigate how the experience of art (creating, appreciating), type of art (music, visual), and the presence of others (yes, no) affect wellness in undergraduates. Approximately 200 participants will be randomly assigned to groups. After their assigned arts experience, they will answer questions to assess wellness. We expect that participants who create music with others present will show the highest wellness ratings. (**Dr. Wendy Heath**) **URSA 2021-2022**

## Wilson, Jordan

*Effect of Benzalkonium Chloride on Natural Plankton Assemblages in Centennial Lake, Lawrenceville, New Jersey*

Benzalkonium chloride (BAC) is an ammonium quaternary compound and surfactant that is used in disinfectants. The compound is a prevalent ingredient in household and medical disinfectants and studies have repeatedly shown the negative effects of the compound on aquatic life. The current study looks at the effect of two concentrations of BAC, 0.2 mg/L and 0.05 mg/L, on a natural plankton assemblage in Centennial Lake on the campus of Rider University, Lawrenceville, NJ. A dilution experiment, which is a technique that uses a series of dilutions to determine phytoplankton growth rates and feeding rates of zooplankton, was performed. Three replicates were set up for each of five dilution percentages at two BAC concentrations and a control. Samples were filtered for initial chlorophyll concentration ($T_0$), then incubated in the lake using floating baskets for 24 hours, before being filtered for chlorophyll again ($T_{24}$). Chlorophyll concentrations were measured using a Turner fluorometer. A reduction in phytoplankton growth was evident at both concentrations of BAC,

indicating that the plankton assemblage was highly sensitive to even low concentrations of BAC. The negative effects of BAC may become an increasing environmental problem as the Covid-19 outbreak continues to increase the use of disinfectants. (**Dr. Gabriela Smalley**) **PSTR**

## Winzinger, Sarah

*Effects of Death Anxiety on COVID-19 Health-Related Prosocial Behavior Cooperation*

In the past year, the Covid-19 pandemic has caused over 3 million deaths worldwide, over 500,000 in the US alone. The constant awareness of the potential for one's own sickness and even death has created the perfect scenario for experiencing death anxiety. Viewing the issue of slowing and stopping the spread of Coronavirus as a collective action problem and willingness to cooperate with health and government recommendations as prosocial behaviors, the question was how does death anxiety affect people's willingness to cooperate with Covid-19 health regulations. Participants (*N= 122*) were selected through Mechanical Turk and randomly assigned to view a Neutral video, a General Mortality Salience video, or a Covid-19 Mortality Salience video. Their general anxiety (GAD-7), death anxiety (DAS), and willingness to comply with Covid-19 regulations generally and if mandated by the government were measured. Results showed significant differences between the Covid-19 Mortality Salience group and the Neutral group in general anxiety levels. No other significant differences were found between the three video condition groups on the dependent measures. The results did show the Covid-19 Mortality Salience group trending toward being more willing to comply with health regulations, but not at a significant level. (**Dr. Elaine Scorpio**) **PSTR**

## Woodward, Benjamin

*Rider Woods Understory Restoration: Deer Deterrent Methods for Native Wildflower Species*

Following the extirpation of wolves throughout the eastern United States in the 1900s, increased deer populations negatively impacted forest understory regeneration. The goal of this project was to determine the best method for protecting native plant species in forest understories, using methods to deter deer herbivory. We grew 10 native wildflower species from seed under 12hr day/night cycles, half of the species from a deer-resistant seed mix and half from a shade-tolerant mix. Once mature, the potted plants will be divided into four groups and moved out to Rider Woods, then subjected to one of four treatments: control, wolf urine granules, blood meal, or organic systemic repellent. Plant height and percent cover will be measured before and after the five days plants will spend in the woods. Based on prior research, predator odors have been found to prevent as much as 60% of deer herbivory in understories. Therefore, we expect that the wolf urine granules will be the most effective deer deterrent, and plants in this treatment will lose the lowest amount of leaf area. Across all treatments, we also predict that species from the deer-resistant seed mix will experience less herbivory than species from the shade-tolerant mix. (**Dr. Kerrie Sendall**) **PSTR**