



# SCHEDULE

## Student Research & Internship Symposium

Thursday, October 12, 2023

Edith Kinney Gaylord Cornerstone Arts Center

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3-4 P.M.                      RICHARD F. CELESTE THEATRE

### Opening Remarks

**Song Richardson**, President of the College

### Student Presentations on their Collaborative Research

**Emmie Weprin '24**, Student Identity and Agency in Disability Labels Related to Emotion and Behavior

**Gabe Keller '24; Beatrice Roussel '24**, Impact of Prenatal and Postnatal Inulin/Psyllium Supplementation on Serum BDNF in Maternally Separated Rats

**Hayley Heinecken '24**, Pattern Formation in Arid Grasslands

**Gabriel Gordillo '25**, The Rights of Passage into History: Interrogating the Archive via Hmong Veteran Stories

### Student Presentations on their Internships

**Tyler Yung '24**, Palmer Land Conservancy, Colorado Springs, CO (Colorado College's Public Interest Fellowship Program)

**Lucia Penzel '24**, Lown Cardiology Group, Chestnut Hills, MA

**Jaxon Hoskinson '24**, Inside Out Youth Services, Colorado Springs, CO; **Annette Leyva '24**, American Civil Liberties Union of Colorado (ACLU), Denver, CO (Colorado College's Public Interest Fellowship Program)

4-5:30 P.M.                      CORNERSTONE MAIN SPACE

### Poster Presentations

4-4:30 P.M.    Poster Session 1    Research Abstracts P1-P23/ Internship Summaries P1-P25

4:30-5 P.M.    Poster Session 2    Research Abstracts P24-P44/ Internship Summaries P26-P50

5-5:30 P.M.    Poster Session 3    Research Abstracts P45-P64/ Internship Summaries P51-P75



## Dear CC Community and Parents,

Welcome to the annual Student-Faculty Collaborative Research (SCoRE) and Internship Symposium! We are here to celebrate the fascinating research and internship experiences that Colorado College students undertake with the support of their faculty, staff, alumni, and internship mentors, both on and off campus.

The hands-on, immersive learning that takes place during summer research and internships is essential to the CC experience. Today, we will provide a window into that time of discovery. Our outstanding students will guide you through their presentations and poster sessions across a variety of disciplines and fields of study. They may even invite you to take part in discussions and think critically about their findings.

This kind of deep learning helps CC students build invaluable skills, such as bouncing back from failure, creative problem-solving, risk and resilience, and collaboration. Students will take this toolkit with them no matter what path they follow after graduation — and use it to seize new opportunities and tackle complex challenges.

I am so proud of our scholars and young leaders whose hard work and innovative spirit are on display today. Thank you to the faculty, staff, alumni, and internship providers who mentor and encourage these students, and whose passion and potential for learning inspire us every day.

Sincerely,

**L. SONG RICHARDSON**

President of the College

# STUDENT ORAL PRESENTATIONS

## **Impact of Prenatal and Postnatal Inulin/Psyllium Supplementation on Serum BDNF in Maternally Separated Rats**

**Student Researchers:** Gabe Keller '24; Beatrice Roussell '24

**Majors:** Neuroscience; Neuroscience

**Research Collaborators:** Nadia Hill '24; Matthew Viozzi '24

**Faculty Collaborator:** Lori Driscoll, Psychology

Stressful experiences early in life, such as being neglected by caregivers, can influence mental health later in life, both directly and through impacting the health of the gastrointestinal tract. In rodent models, these stressful experiences, called early life adversity (ELA), are commonly modeled through maternal separation (MS), in which newborn pups are isolated from their dam during the first two weeks of life. The aim of the current study is to determine whether prenatal and postnatal dietary supplementation with an inulin fiber and psyllium husk enriched diet could mitigate the negative impacts of ELA by raising brain-derived neurotrophic factor (BDNF) levels. Long-Evans Dams were randomly assigned to purified control or inulin/psyllium-enriched chow on the last week of gestation. At birth, litters were maintained on the control or inulin chow to which their dams were assigned. Half of the litters from each diet group were randomly administered maternal separation in which they were isolated from their dam for four hours per day from postnatal days 1 to 14. After weaning, rats were tested in behavioral paradigms designed to examine recognition and spatial memory. Six pups from each treatment group were euthanized and fresh cecal samples were taken on PNDs 14, 21, and 28 for 16S ribosomal DNA analysis of bacterial species composition and diversity, a measure of gut health. Two rats from each litter were euthanized, and right ventricular blood perfusion was conducted to sample blood serum BDNF. Blood serum BDNF was analyzed using ELISA kits. Available results indicate that maternal separation did not consistently induce depressive or anxiety-like behavior across males and females. Inulin/psyllium supplementation showed an increase in BDNF levels in blood serum across all treatment conditions. Our results suggest that inulin/psyllium supplementation might be a viable strategy in treating early life adversity by raising BDNF levels.

## **Student Identity and Agency in Disability Labels Related to Emotion and Behavior**

**Student Researcher:** Emmie Weprin '24

**Major:** History

**Minor:** Education

**Faculty Collaborator:** Nickie Coomer, Education

Children are often labeled by schools as having emotional and behavioral difficulties in school. However, this may only be a difficulty that exists within a school setting. This project attempts to better understand the ways that kids and parents internalize this behavioral label. The development of a survey, IRB, and interview questions were the main goals of the summer. We drafted interview and survey questions that took into consideration intersectional identities, especially those of children with disabilities. The survey was different for both students and parents to get an idea of perception of schooling and internalization of behavior. For parents we were especially interested in learning about the ways that a label of their child influenced the way they viewed their child, school, and parents. For students, we developed surveys at many different developmental ages so that children would be able to answer questions that were appropriate, as we understand that the label of behavior can start at a very young age. The survey demographic is not specific to the springs though the survey is sent to many parents in the local area.

## Pattern Formation in Arid Grasslands

**Student Researcher:** Hayley Heinecken '24

**Major:** Mathematics

**Faculty Collaborators:** David Brown, Mathematics and Computer Science; Miro Kummel, Environmental Program

After taking Partial Differential Equations with Professor Brown last winter and having the opportunity to hear about his research and previous collaboration with Miro, I spoke to Professor Brown about the possibility of summer research. This summer, the research took the form of tweaking a previous model of pattern formation by adding two new terms. The existing model had functioned based on the idea that, in arid grasslands, rainfall flows downhill after hitting the ground, and seeps into the soil where plants roots penetrate the soil. Where there aren't plants, the water will simply continue flowing. This begins a positive feedback loop where areas with and without plant growth can sustain, and the system reaches a harmony of sorts. Simulations and mathematical analysis of the system show that the system is incredibly resilient and can sustain life much below the value of rainfall that is needed to initiate growth, in some cases as low as 20%. This is the most impactful conclusion that we came to during the research, and has important ecological implications.

## The Rights of Passage into History: Interrogating the Archive via Hmong Veteran Stories

**Student Researcher:** Gabriel Gordillo '25

**Major:** English Literature

**Faculty Collaborator:** Aline Lo, English

Hmong veterans from the clandestine USA operation in Laos during the Vietnam war have become a key contingent of the Asian-American fabric and the veteran's rights movements. As part of the Veteran's History Project, several recordings of Hmong soldiers' experiences are housed at the Library of Congress. The chance to visit the Library of Congress and listen to these recordings allows the opportunity to explore the creation and representation of archival material. Such an interrogation of the idea of the archive is concurrent with other academics' activity in the field of Hmong-studies and refugee-studies. The audio-recordings of Hmong soldiers who immigrated to the United States following the Vietnam War were compared to the video-taped interviews of American veterans from Vietnam. The most striking contrast between both sets of recordings is the detail provided by the veterans. While American veterans often sat down for long personal accounts of their experience, the Hmong veterans presented quite truncated and bare accounts of their wartime activity. The comparisons between the material created discussion around how oral-history is conducted, how archival material itself is created and/or collated, and how the experiences of refugees affects the histories, stories, and materials they leave behind.

## Palmer Land Conservancy, Colorado Springs, CO

Colorado College's Public Interest Fellowship Program

**Student Intern:** Tyler Yung '24

**Majors:** Environmental Studies

This past summer, I worked at Palmer Land Conservancy (PLC) as the Heather Campbell Chaney Environmental Fellow. PLC is the 17th largest land trust in the U.S., responsible for conserving over 137,000 across Colorado through conservation easements. As a part of my fellowship, I was responsible for monitoring 20 of Palmer's public properties held under easement, which include locally famous open spaces such as Red Rock Canyon Open Space and Bear Creek Regional Park. Therefore, I spent the majority of the summer out on the land, conversing with public land managers and learning about the complex ecological interactions that exist on each property. When not out in the field, I would often spend my time in the Palmer office, working alongside many individuals who are all extremely hardworking and passionate about protecting the land for the benefit of all people here in Southern Colorado.

## **Lown Cardiovascular Group, Boston, MA**

**Student Intern:** Lucia Penzel '24

**Major:** Molecular Biology

This summer I had the opportunity to intern with Exercise Physiologists at the Lown Cardiovascular Group in Boston, MA. The Lown Group is a concierge cardiology practice with a mission to provide proactive, personalized, and preventative care. During my time as an intern, I assisted in providing exercise stress tests (ETT) and stress echocardiogram tests (STE) to both patients of the practice and referrals from other Boston health care providers. The purpose of the ETTs and STEs were to evaluate how a patient responded to an increased workload on their heart. The Exercise Physiologists evaluate this by monitoring the electrical signals in the heart through an electrocardiogram (ECG), and by recording how blood pressure and heart rate changes as workload increases. As an intern my job included prepping patients for their test by hooking them up to the ECG, explaining the test to them, and then also assisting in monitoring the ECG throughout the test and listening for blood pressures. Throughout my time at Lown Cardiovascular Group, I gained an immense amount of knowledge about how the heart functions and heart disease. I am extremely grateful I had the opportunity to learn from the team at Lown Cardiovascular Group this summer. [www.lowngroup.org/](http://www.lowngroup.org/)

## **Inside Out Youth Services, Colorado Springs, CO**

Colorado College's Public Interest Fellowship Program

**Student Intern:** Jaxon Hoskinson '24

**Major:** Political Science and Philosophy

During my summer internship at Inside Out Youth Services, my primary responsibilities were to attend tabling and training events with other members of our Communications Teams, as well as help with project-based tasks that they needed my help on. For instance, our organization is working on creating a list of responses and talking points we can use to engage with local elected officials to help us better advocate for LGBTQIA2+ youth in Colorado Springs. I was given the opportunity to help research information for this project and compile it into easily accessible formats. I also helped launch a local community calendar that complies queer friendly events and spaces in one space for easy access, assisted with direct programming for our youth and young adults, and got the opportunity to work with many different departments organization wide to assist in whatever ways I could. Being able to explore the world of non-profits in such a varied way was extremely fulfilling and beneficial for me professionally, but more importantly, personally. <https://insideoutys.org/>

## **ACLU-Colorado, Denver, CO**

Colorado College's Public Interest Fellowship Program

**Student Intern:** Annette Leyva '24

**Majors:** Political Science and Hispanic Studies

The ACLU of Colorado is the state's largest and oldest civil rights organization. We work to protect the civil rights and liberties of all Coloradans through litigation, education, and advocacy. This summer I worked at the ACLU-CO as an Organizing Fellow. The Organizing team is crucial to the advocacy that the ACLU-CO does; we build meaningful relationships with community members and partners to ensure the community's needs and voices are centered in our work. We did a lot of outreach to be present with the community and hear what they need from us. This included working smaller tabling events, but also larger events like Denver Juneteenth and Pride. A major component of the ACLU-CO's advocacy is not only getting input from the community, but giving resources to empower. This was exemplified in our first Summer Advocacy Training which was a powerful event where we came in community to work on how we can make Colorado an equitable and just place for all. [www.aclu-co.org/en/about](http://www.aclu-co.org/en/about)

# What is SCoRe?



During the summer of 2023, over 110 students participated in research under the mentorship and support of Colorado College's dedicated faculty both on and off campus. While the Block Plan structures academics around a condensed timeline, summer research allows students and faculty collaboratively to explore deeper into topics, by spending extended time researching in the classroom, the library, the lab, and the field.

The Student Collaborative Research (SCoRe) Program supports both students and faculty through academic and community field trips and gatherings, peer-to-peer presentations and discussions, and professional development workshops. We are excited to showcase the work CC faculty and students have done this summer.

Visit: <https://www.coloradocollege.edu/offices/careercenter/our-programs/research-opportunities/index.html>

# RESEARCH POSTER PRESENTATIONS, ABSTRACTS P1-P23

## **P1 Enhancing biofilm retention through atmospheric-pressure plasma jet treatment of polypropylene**

**Student Researchers:** Vanessa Perez '26; Andrew Biesiada '26; Mauricio Erazo Jr.' 25

**Majors:** Physics; Molecular Biology; Molecular Biology

**Faculty Collaborators:** Olivia Hatton, Molecular Biology; Adam Light, Physics

Biofilms are aggregates of bacteria that play crucial roles in various biological and environmental processes, ranging from crop preservation to the etiology of health issues. Biofilm growth assays, a common lab technique of growing and studying biofilm formation, have provided further insight into the applications and control of biofilms. Various errors that may occur within the lab present challenges for biofilm retention. Being able to increase biofilm retention can allow for a better understanding of its properties. This project aims to enhance the wettability of *P. aeruginosa* biofilm on the surface of polypropylene, the material utilized in well plates, through the application of atmospheric-pressure plasma jet treatment. We tested and observed the changes in contact angle measurements between untreated and plasma jet treated polypropylene samples. Biofilm growth assays were then performed in well plates to identify changes in biofilm retention. Wettability of the polypropylene surface increased but changes in biofilm formation remained static. We present our experimental setup, analysis techniques, and preliminary results.

## **P2 Projection Operators for Protein Modeling**

**Student Researchers:** Elliot Triplett '24; Judinelly Gonzalez '25

**Majors:** Computer Science; Computer Science

**Faculty Collaborator:** Cory B. Scott, Computer Science and Mathematics

Implicit representations of data are a new topic of machine learning research. The goal of an implicit representation is to find a way to represent a dataset that improves the performance of machine learning models by making their task easier. While implicit methods have been developed for lots of types of data like images and video, representations for other kinds of data like proteins has lagged behind. One recent approach (a GINR, or Generalized Implicit Neural Representation) represents proteins by training a small neural network to learn about the proteins' shape. However, GINRs have the drawback that they can only learn about a single protein at a time. This limits the biological application of the GINR model. We develop a version of GINRs that can be trained to represent one protein and then re-trained on ("transferred to") another. We investigate:

- What hyperparameter choices influence the accuracy of the retained model?
- What is the relationship between the similarity of the proteins, and the amount of error in transferring?
- Does this new model outperform the original GINR model?



### **P3 Optimized Extraction and Initial Bioassay of Phytochemicals in *Silphium Integrifolium***

**Student Researchers:** Shianne Freeman '25; Simone Zhang '25

**Majors:** Education and Race, Ethnicity; Migration Studies

**Research Collaborator:** Ebony Murrell, Kansas Land Institute

**Faculty Collaborator:** Murphy Brausel, Chemistry and Biochemistry

*Silphium integrifolium*, a sunflower-like plant, is commonly known as Rosinweed with the commercial potential to yield oil seeds due to its advantages like inherent insect herbivore resistance. This study utilizes cold ethanol extraction to optimize extraction of insecticidal chemicals for identification. Compared to the traditional extraction methods, Cold ethanol extraction method is capable of extracting phytochemicals such as terpenes without extracting long-chain lipids, chlorophylls, waxes and other undesired organic compounds in a temperature range of -40C to -70C. This promotes subsequent GC-MS analysis and allows for more comprehensive phytochemical Feed bioassays on *Spodoptera frugiperda* as known as Fall Armyworms. Across all extracts, GC-MS data showed 14 major peaks unique to Rosinweed, 5 of which were able to be identified. Initial bioassay data suggests that cold isopropyl extraction is more effective at phytochemical and insecticidal chemical extraction. Isopropyl extractions from the Central and Eastern regions proved highly effective at high concentrations in mortality testing of *Spodoptera frugiperda* in the neonate and first instar stages.

### **P4 Cataloging Ancient Roman Coins, Antoninus to Commodus**

**Student Researcher:** Olivia Garg '24

**Major:** History

**Faculty Collaborator:** Richard Fernando Buxton, Classics

Across the street from the Worner building lies the often-overlooked Money Museum, home to the respected American Numismatic Association (ANA). Envisioned by the Colorado College Classics department and executed in the past, I helped catalog ANA's trove of ancient Roman coins, a tangible link to the past, which can enrich classroom learning.

At the heart of my endeavor was Roman Imperial Coinage Book 3 (RIC III), which spanned Antoninus Pius (r.138-161) to Commodus (r.177-192) – the 1920s book documents coins minted by these emperors. My responsibility was to pair each ANA coin with its correct RIC III number. Thankfully, most coins were identified, so I concentrated on capturing photographs and ensuring tags matched the accurate RIC III number, type, material, weight, and year. I meticulously entered this information into a spreadsheet, along with a physical rating of each coin and a description of what was on the coin. The Colorado College Classics department will utilize the spreadsheet for future education purposes to easily access coins of specific emperor, type, and condition.

### **P5 Understanding the Hermitian-Lifted Code**

**Student Researcher:** Cooper Tull '25

**Major:** Undeclared

**Faculty Collaborator:** Beth Malmskog, Mathematics and Computer Science

my student research experience of the summer of 2023, I studied error-correcting codes, and more specifically, the Hermitian-Lifted Code under Professor Beth Malmskog. We covered important concepts theorems concerning finite Abstract Algebra, then studied the underlying basics of Error-Correcting Codes from Judy Walker's textbook *Codes and Curves*. Once I was familiar enough with the mechanisms of Error-Correcting Codes, I studied a recently published paper, *Hermitian-Lifted Codes*, written by Professor Malmskog and several of her peers. This was a difficult task, the paper is very technical and requires an understanding of Algebra that many undergrad students lack. For my project, I wrote an expository paper that attempts to educate the average undergraduate math student on the Hermitian-Lifted Code. The paper concisely and intuitively covers the theorems of Error-Correcting Codes that are necessary for understanding the Hermitian-Lifted Code. The paper then provides a step by step explanation of proving the main result of the Hermitian-Lifted Code.

## **P6 Developing a Mastery Service for ASSISTments**

**Student Researcher:** Obie Kahne '24

**Major:** Mathematics

**Research Collaborator:** Hector Rodriguez, Shailen Smith

**Faculty Collaborator:** Neil Heffernan, Learning Sciences & Technologies

Knowledge Tracing (KT), the practice of modeling and predicting student learning and mastery over time, enables online learning platforms to tailor content to students and provides teachers and researchers with a meaningful record of student performance. In this work, we designed and implemented a KT service for the ASSISTments learning platform. Using ASSISTments educational data from the past year, we compared two established KT models for use in the service; we find that Bayesian Knowledge Tracing (BKT) outperforms Performance Factors Analysis (PFA) in predicting student performance. Using BKT, we developed a minimum viable product of the KT service which tracks student mastery in real time and allows teachers and researchers to query current and historical mastery data. Once fully implemented, we expect the service to enhance data-driven, customized learning across the ASSISTments platform.

## **P7 Formalizing Sylow Theorems in Homotopy Type Theory using Agda**

**Student Researchers:** Sam Johnson '25; Isak Larson '25; Brendan McCune' 25

**Majors:** Mathematics; Mathematics; Mathematics

**Faculty Collaborator:** Joseph Rennie, Mathematics and Computer Science

We focused on the formalization of the Sylow Theorems, which are important Group Theory results, in Homotopy Type Theory. Computer formalization allows for a guarantee of correctness in mathematical findings by type checking proofs for consistency with provided mathematical axioms, eliminating the need for labor intensive and fallible expert confirmations of proposed proofs. Working in Homotopy Type Theory allows for an intuitive set of axioms for working with spaces and paths, and a pre-existing higher-group generalization of the Sylow Theorems provides promise that a Homotopy Type Theoretic proof of the Sylow Theorems is possible. Such a proof would facilitate the classification of higher groups. When applied to 2-groups, for example, this has implications for field theories in physics, such as gauge theories. These Homotopy Type Theory proofs also allow us to reason about sheaves, which have applications to computer science, such as Sheaf Neural Nets. The formalization of the Sylow Theorems also provides a good benchmark for an automated mathematical system.

## **P8 Inner Kinetochores Compositions Across Diverse Centromere Types in Budding Yeasts**

**Student Researcher:** Mai Tien Nguyen '24

**Major:** Computer Science

**Research Collaborator:** Jennifer Garcia, University of New England

**Faculty Collaborator:** Sara Hanson, Molecular Biology

The kinetochore, a multiprotein structure, links centromeres to microtubules during eukaryotic cell division, ensuring accurate chromosome segregation. Centromeres are specific chromosomal regions that serve as platforms for kinetochore assembly. While functionally conserved, kinetochore composition and centromere organization exhibit diversity in eukaryotes. In budding yeasts (subphylum Saccharomycotina), centromeres vary from short, sequence-specific point centromeres to larger regional centromeres. To inventory inner kinetochore compositions in budding yeasts with varying centromere types, we developed “mign”, a tool written in Python, to automate the homolog identification of 20 inner kinetochore proteins in 338 species. During the homolog identification process, certain inner kinetochore proteins in budding yeasts exhibit greater similarity to fission yeast *Schizosaccharomyces pombe*, as opposed to *Saccharomyces cerevisiae*. The resulting inventory reveals that proteins previously recognized to be linked with point centromeres are also present in species featuring regional centromeres. Additionally, the inner kinetochore inventory in the Saccharomycodaceae family positions it as a candidate for centromere type research, given the limited knowledge of centromere types within this family. Understanding inner kinetochore compositions in relation to centromere types offers insight into the coevolution of centromeric DNA sequences and associated proteins. The data obtained here provides directions for future wet lab projects.

## **P9 Analysis of Volatiles and Nectar Composition from Flowers of *Pleurothallis* Subgenus *Ancipitia* (Orchidaceae) and *Macrophyllae-Fasciculatae* To Determine if Species are Consistent with Deceptive Pollination**

**Student Researcher:** Ashlyn Walker '25

**Major:** Biochemistry

**Faculty Collaborators:** Mark Wilson, Organismal Biology & Ecology; Murphy Brasuel, Chemistry & Biochemistry

The orchid genus *Pleurothallis* reproduces through reward or deceit pollination. The different reproductive strategies are often dependent on the shape, size, and color of the flowers. Neotropical orchids exhibit flowers that are sometimes pollinated using sexual deceit, also known as pseudocopulation. In these instances, the flowers emit semiochemicals imitating mates. This research focuses on the orchid subgenus *Ancipitia*, in which it is hypothesized that the deceptive species of flowers can be differentiated from the rewarding species, based on specific floral volatile profiles and quantification of nectar. Using gas chromatography-mass spectroscopy (GC-MS) analysis it is confirmed that several chemical volatiles that may act as allomones are present in *Ancipitia* flowers. Utilizing the identified volatiles, dendrograms group closely related deceptive species, *P. wieli*, *P. renieana*, and *P. acinaciformis*. The deceptive species have distinct allomones and pheromones present at a fixed ratio within their flowers. Liquid chromatography-mass spectrometry (LC-MS) was used to analyze the nectar droplets present on *Ancipitia* and *Macrophyllae-Fasciculatae* flowers to quantify sugar amounts and identify significant monosaccharides and disaccharides.

## **P10 Developing Customized Augmentative and Alternative Communication (AAC) Devices for Non-verbal Individuals with Autism**

**Student Researchers:** Yael Homa '25; Vladimir Palma '26

**Majors:** Computer Science and Art: Art Studio; Undeclared

**Research Collaborator:** Annushka Zolyomi, UW Bothell

**Faculty Collaborator:** Varsha Koushik, Mathematics and Computer Science

Non-verbal individuals with Autism often use Augmentative Alternative Devices (AAC) for communication. These devices display a set of icons representing conversational words, and individuals form sentences by clicking on these icons. However, these devices are time-consuming to use and limit conversational access as they do not include contextual information, such as time, location, or activity. To address this problem, we have created a prototype for a contextual AAC application that can recognize time, current location, and daily routines. We followed a user-centered design process, where we brainstormed interfaces based on previous conversations with users and stakeholders. Through this, we created a Wizard-of-Oz prototype for a full-stack application that enables contextual communication. The new user interface displays screens for different rooms and times, based on real-world data, using a relational database. This project will advance the state-of-the-art AACs and enable future researchers and designers to create more accessible communication devices.

## **P11 Optimization of Tip Etching for Scanning Probe Microscopy Studies of Semiconductor Superlattices**

**Student Researcher:** John T. Lê '24

**Majors:** Physics and Mathematics

**Research Collaborators:** Phillip N. First (Georgia Institute of Technology); Zhigang Jiang (Georgia Institute of Technology)

Semiconductors are powerful materials at the heart of our everyday technology and electronics. We are specifically motivated to study semiconductor superlattices, where two different semiconductor materials (either doped or undoped) are alternated in few-nanometer layers to create a new material, with electronic properties tuned by the superlattice alternation period. To understand the properties of these superlattices, we characterize their atomic structure by Scanning Tunneling Microscopy (STM) and/or Atomic Force Microscopy (AFM). These techniques help us study quantities such as the bandgap [1] and the energy spectrum [2]. Scanning semiconductor surfaces at the atomic-level requires an atomically-sharp tip, which transmits either the tunneling current in STM or the force in AFM. To achieve atomic resolution in topographical scans, the tip apex should be comparable to the size of a single atom. This requires well-controlled electrochemical etching and further "tip preparation" within the STM/AFM instrument. We present an adaptable procedure for creating homebrew tips using electrochemical etching for tungsten and platinum-iridium wire, where certain conditions must be met to effectively shape the tip. We also present some of the data we acquired using the tips etched according to the procedure we developed.

## **P12 'You Raise Me Up:' Investigating Multi-Generational Trends and the Impact of Role Model Effects in Women's in Intergenerational Socioeconomic Mobility in the United States**

**Student Researcher:** Owen Rask '24

**Major:** Economics

**Minors:** Political Science and Mathematics

**Faculty Collaborator:** Minh Kim, Mathematics and Computer Science

Studies of intergenerational mobility often focus on single father-to-son generational relationships due to the historical difficulty in modeling women's workforce participation and the lack of longitudinal data. In this study, we utilize the NLSY79 and NLSY97 alongside a Heckman two-step correction to analyze multigenerational trends of women's socioeconomic mobility within the United States. We estimate trends of intergenerational elasticity (IGE) and intergenerational rank association (IRA), investigating cultural factors affecting income mobility, specifically the impact of role model effects on women's mobility through a proxy of the respondent's mother working outside the household during teenage years. First, we find that the role model effect is insignificant for women born in the 1950s, yet the two-step correction is necessary to control selection bias. This correction is unnecessary for the 1980s women, while role model effects are significant. For mobility outcomes, we find women's IGE doubled between the two generations while men's IGE became negative—but, as previous studies show, IGE estimates are unreliable. Our more robust IRA estimates suggest that men's and women's average mobility decreased by 40% or more between the two generations. These results support other findings indicating that socioeconomic mobility in the US has decreased over the past generations.

## **P13 Synthesis of Fluorinated Amodiaquine Analogs**

**Student Researchers:** Kinsey Clark '25; Destiny Pena '24

**Majors:** Chemistry; Biochemistry

**Faculty Collaborator:** Habiba Vaghoo, Chemistry and Biochemistry

The malaria parasite *P. falciparum* is a threat to millions worldwide, but resistance to the drugs used to treat is increasing. Amodiaquine and its analogs have been pursued as alternative antimalarial drugs due to its antimalarial activity against resistant strains, but it metabolizes into a toxic quinoneimine. It was hypothesized that this in vivo biproduct could be prevented with a substitution of the hydroxyl moiety with a difluoromethyl moiety. Fluorine's unique properties in pharmaceuticals has led to its addition to an increasing number of new pharmaceutical compounds, and its use in this research has the potential to be an effective and safer new antimalarial. This research successfully prepared two fluorinated analogs of Amodiaquine with purity above 95% using a two-step synthesis involving reducing a (difluoromethyl)nitrobenzene to an aniline which is then reacted with a quinoline compound. Further biological study of the compounds will be necessary to test the antimalaria activity, as well as the synthesis of similar compounds with the addition of side chains to the ring of the aniline component.

## **P14 Rethinking Opposition: An Intersectional Analysis of Hungary's 2022 Parliamentary Elections and Referendum**

**Student Researcher:** Sonya Harrison '24

**Major:** Political Science

**Minor:** Feminist and Gender Studies

**Research Collaborator:** Elizabeth Girian '24

**Faculty Collaborator:** John Gould, Political Science

This paper examines the interaction between Hungary's unified opposition and LGBTQ+ activists during the 2022 parliamentary election campaign. We argue that the opposition's strategy of political unity and message centering burdens marginalized groups. In an often-vain quest to attract the elusive "mainstream voter," unified oppositions have incentives to remain silent on the concerns of those at the intersection of multiple avenues of oppression. As importantly, centering and unity do little to dismantle marginalizing imaginaries that incumbents have deliberately built with the polarizing tropes of homophobia, xenophobia, and racism. Rather than dismantling the incumbent's imaginary "landscape of enemies," the strategy of 'centering and unity' seeks to occupy it. It reinforces the normalization of CIS-gendered, ethno-patriarchal modes of political agency and makes it nearly impossible to focus on the needs of marginalized groups. Instead of reflexively challenging authoritarian incumbents using the centering and unity strategy, opposition groups should consider dismantling the polarizing rhetoric that artificially divides citizens. In practice this would allow opposition groups to show greater solidarity with the particular needs and concerns of marginalized groups.

## **P15 NKX2.2 is required for the establishment of proper $\beta$ -cell transcriptional profiles in hESC models of pancreas development**

**Student Researcher:** Braelyn Cayaban '25

**Major:** Molecular Biology

**Research Collaborator:** Chris Schaaf

**Faculty Collaborator:** Lori Sussel, Cell Biology, Stem Cells, and Development, Barbara Davis Center, University of Colorado – Anschutz Medical Campus, Aurora, CO; Developing Scholars Program

NKX2.2 is a homeodomain transcription factor that is important for pancreatic endocrine cell differentiation and function during mouse and human development. In mouse knockouts of *Nkx2.2*, there is a complete loss of  $\beta$  cells. Individuals who carry homozygous null mutations in NKX2.2 are diagnosed with neonatal diabetes. However, preliminary data has shown that NKX2.2KO human embryonic stem cells are still able to generate a small number of insulin+ cells when pushed through a  $\beta$ -cell differentiation protocol. This study will shed light upon if NKX2.2 is a critical regulator of  $\beta$ -cell functionality and maturation in humans. To determine the functionality of NKX2.2KO INS+  $\beta$  cells, differentiations were performed until d30 by following a specific sc-derived islet protocol of the wildtype and NKX2.2 knockout stem cells. INS+  $\beta$  cells were analyzed for glucose response and insulin secretion by performing a static glucose stimulated insulin secretion assays. Our study on insulin secretion dynamics was inconclusive but provided us with information on how to optimize future functional studies. We observed dysregulated expression of PDX1 and NKX6.1 in NKX2.2KO INS+  $\beta$  cells which is a sign of immaturity in  $\beta$  cells. Therefore, NKX2.2 is required for the proper  $\beta$ -cell transcriptional profiles in hESC models of pancreas development.

## P16 Optimization of a photochemically driven benzyne reaction

**Student Researcher:** Enrique Hernandez Salcido '24

**Major:** Chemistry

**Research Collaborators:** Ben Sokol '22; Will Abbey '22

**Faculty Collaborator:** Jessica Kisunzu, Chemistry and Biochemistry

The reactivity that comes from arynes' unstable strain has made it a molecule that is highly sought out to use and intentionally apply. Currently, one of the more widespread methods for benzyne formation is the use of 2-(trimethylsilyl) phenyltrifluoromethanesulfonate (silyl-triflate) with a fluoride source such as CsF. There is still a need to further develop complementary benzyne generation methods that are more time efficient. An early appearance of a photochemically produced benzyne was reported in 1975 by Y. Maki and coworkers through the utilization of a high-pressure mercury lamp where they discovered that 2-(3-acetyl-3-methyltriaz-1-en-1-yl) benzoic acid (AMTBA) can be a useful benzyne precursor. Upon irradiation of AMTBA with a UV light, it can produce benzyne which react with substrates at a highly reduced time frame compared to other methods. Previous work in our group shows the successful synthesis of AMTBA and the replication of known benzyne reactions under photochemical conditions. Through the use and practice of solvent sparging, a new photoreactor design, creating stock solutions, and utilizing quartz glassware for the reaction, we are able to report the significant improvement of insertion reactions, cycloadditions, and nucleophilic additions using AMTBA.

## P17 Selection of day-roost habitat by Flammulated Owls

**Student Researcher:** Eve Karowe '24

**Major:** Organismal Biology and Ecology

**Faculty Collaborator:** Brian Linkhart, Organismal Biology and Ecology

Flammulated Owls (*Psiloscops flammeolus*) are small insectivorous raptors that breed in Ponderosa Pine ecosystems in western North America. These owls depend on old-growth Ponderosa Pine forests for nesting, foraging, and roosting habitat. The importance of old-growth forests on the owls' nesting and foraging behaviors has been well documented, but less is known about their importance for the owls' day roosting habits. I sought to address this gap in knowledge by collecting data on the roost locations of 3 male Flammulated Owls during their breeding season. I tagged these owls with radio transmitters and located them on their roosts during the day over a month-long period on the Manitou Experimental Forest in central Colorado. I recorded the DBH (diameter at breast height) of the roost tree as a proxy for tree age, and the approximate age of the trees comprising the stand that the tree was located in. I used these data to reveal trends in the owls' roost selection preferences in relation to the ages of trees and stands they chose to roost in, demonstrating the impact old-growth forests have on owl roosting behavior.

## **P18 Characterization and Preservation of Toned Cyanotypes**

**Student Researcher:** Kathy Lu '25

**Major:** Biochemistry

**Faculty Collaborator:** Amanda Bowman, Chemistry and Biochemistry

Of the many photographic techniques developed in the 1800s, cyanotype photograms have become increasingly popular due to their simplicity, flexibility, and relatively cheap process. Often, these prints are treated with other chemical compounds (i.e., tannic acid, gallic acid, nickel chloride, or lead acetate) in a process known as toning to alter their coloration. Historically, the process of toning has been difficult to fully identify and has largely been ignored by conservation chemists. As a result, studies regarding preservation conditions are also fairly rudimentary. The Bowman lab has previously assessed the use of infrared spectroscopy (IR) and optical microscopy to identify toners; however, developing more tools for analyzing chemical compositions provides valuable information for conservation methods. When applied, Raman spectroscopy was successful in characterizing all four toners. X-ray fluorescence (XRF) and IR, however, were unsuccessful in characterizing all four toners (i.e., gallic and tannic acid in the case of X-ray fluorescence, and nickel (II) chloride in the case of IR). Exposure to various temperatures, humidities, and light sources revealed that certain prints were most susceptible to change under sunlight and higher temperatures while changes due to humidity were less apparent. The data presented in this research will help to develop more accessible techniques for identifying and preserving work within museum and conservation studies.

## **P19 Mapping for Policing Male Homosexuality in Eighteenth-Century Paris**

**Student Researcher:** Red Mayhew '24

**Major:** History

**Faculty Collaborators:** Jennifer Golightly, Office of Information Technology; Tip Ragan, History

While working with Tip Ragan on his project and website centered around a set of arrest records pertaining to homosexuality in the 18th century, I found that what was available to the public lacked a visual conceptualization of the data or a way to understand the data as pertaining to a physical Paris. To solve this I created user-friendly interactive maps with the data. I found high-quality maps of Paris made in each decade of the 1700's that I pinned onto the current map of Paris using ArcGIS software. Once geo-referenced, I uploaded the data to online software and added a point location for each of the arrests in the 1780's (the only decade with currently accessible data). Each point was uploaded with the arrest's name, place, circumstances, and outcome. The data showed a high concentration of arrests taking place on the right bank of the Seine, especially in the area around the Tuileries. The map allows users to see data trends as well as interact with individual points. As the data becomes available I will continue to map other decades, and users will be able to compare the data points over time and interface in a physical way with the data.



## **P20 Maintaining an illiberal niche in a liberal international ecosystem**

**Student Researcher:** Elizabeth Girian '24

**Major:** Political Science

**Research Collaborator:** Sonya Harrison '24

**Faculty Collaborator:** John Gould, Political Science

Hungary, a small central European state with a population of just under 10 million and an economy slightly smaller than the city of Berlin, would seem to be an unlikely place to study global hegemonic conflicts. Yet it reveals a great deal about the current condition of the liberal international order (LIO), 1990-2022. We employ the concept of “contested hegemonic order” and use Hungary as a case study to show how defects and flaws in the contemporary LIO have created opportunities for a local autocrat to eviscerate democratic institutions and practices. We show how the rise of an alternative illiberal international “ecosystem” has provided this autocrat with room for maneuver at the fringes of acceptability within the EU. We also introduce the concept of “in/congruence” to demonstrate how Hungary’s illiberalism now poses a significant challenge to liberalism in the EU and further afield. We conclude by arguing that internal liberal coherence is important to the health of the LIO and suggest strategies for how it can be rebuilt and reimagined.

## **P21 San Basilio de Palenque: The Fluidity of Marronage**

**Student Researcher:** Hadit Poveda Morales '26

**Major:** Undeclared

**Faculty Collaborator:** Angela Castro, Spanish and Portuguese

This research examined marronage (cimarronaje) in the largest maroon community in Colombia, San Basilio de Palenque. Over the years, the interpretation of marronage by several authors has shown this concept as simple terminology that can only be applied to historical and political arenas. However, marronage is not static, it is a fluid and complex concept. After spending several weeks investigating and reading about the different conceptualizations on the interpretation of marronage by authors such as Richard Price, Greg Thomas, and Castriela Hernandez, I went to San Basilio de Palenque to study how this maroon community interprets, practices, and lives marronage. Therefore, I propose that marronage is not exclusively from the past and is still implemented and practiced through oral traditions by maroon communities in the Americas. Currently, I am developing an academic article that challenges the current ideas on marronage to demonstrate that it is a fluid concept expressed through the transformation of oral traditions and culture in San Basilio de Palenque.

## **P22 MBL-1 is an alternative splicing factor required for dendrite patterning in *C. elegans***

**Student Researcher:** Aidan Wells '24

**Major:** Molecular Biology

**Research Collaborator:** Meena Kim '25

**Faculty Collaborator:** Darrell Killian, Molecular Biology

Neurons are cells of the nervous system that are responsible for the communication of sensory or synaptic information. Defects in neuron morphology impair neuronal function and are associated with neurological disorders. Therefore, an understanding of the genetic regulation of neuronal morphology is important. The *Caenorhabditis elegans* PVD neuron is an excellent study system due to its complex morphology in an organism that is amenable to genetic manipulation and live imaging. *C. elegans muscleblind* homolog *mbl-1* encodes an RNA-binding protein that is predicted to regulate alternative RNA splicing. Loss of *mbl-1* produces a nervous system phenotype characterized by defects in dendrite patterning and synapse formation. We found that *mbl-1* mutants exhibit reduced terminal branching of the *C. elegans* PVD sensory arbor, with terminal branching becoming progressively more sparse with increasing distance from the cell body. The patterning of 3° and 4° PVD branches in relation to body wall musculature was unaffected in the *mbl-1* mutant and no defects in the macrostructure of the body wall muscle were evident. We tested whether similar defects would be apparent for other types of *C. elegans* neurons and found that dendrites are truncated in several unbranched mechanosensory neurons: the PLMs, ALMs, PVM, and AVM. Surprisingly, we also found that PLMs have longer axons, and the location of their synapse is shifted closer to the cell body in the *mbl-1* mutant. To learn more about the molecular function of MBL-1 protein, we biochemically isolated RNAs bound by MBL-1. The forthcoming sequencing analysis of these bound RNAs may suggest mechanisms by which *mbl-1* regulates neuron morphology.

## **P23 Weaving Textiles into History**

**Student Researchers:** Fiona Ireland '25; Alex Weiss '24

**Majors:** History: History

**Research Collaborator:** Jeanne Steiner

**Faculty Collaborator:** Jane Murphy, History

Over the course of 3 weeks, Fiona Ireland, Alex Weiss, and Prof. Jane Murphy worked with professional weaver Jeanne Steiner to learn the basics of weaving on floor looms. In order to help her design a class that may incorporate hands-on experience with textiles in the future, Fiona and Alex did research on the regional history of weaving between the Mediterranean and Indian Ocean, as well as the pedagogical precedent for using weaving and other hands-on creation as a tool for teaching history, before all of us dove into hands-on lessons on the loom. By the end of the three weeks, each of us produced several wonderful pieces that made us confident in a more integrated and creative approach to the teaching and learning of history and specific approaches to pilot in an upcoming block class which might be organized around different fibers, wool, cotton, and silk.

# RESEARCH POSTER PRESENTATIONS, ABSTRACTS P24-P44

## P24 Mapping [NII] Emissions in the Milky Way Galaxy

**Student Researcher:** Joshua McFeeters '24

**Majors:** Physics and Art History

**Faculty Collaborator:** Dhanesh Krishnarao, Physics

Primarily known for its mapping of hydrogen-alpha emissions throughout the Milky Way, the Wisconsin H-Alpha Mapper (WHAM) telescope also contains a surplus of data regarding ionized nitrogen ([NII]) emission, which provides unique insights into the processes and conditions of the interstellar medium (ISM) throughout the Milky Way. We seek to accurately treat observational data of [NII] emission taken from WHAM, in which we isolate and remove atmospheric emission from that of the Milky Way. Using data collected over 'faint' regions in the sky — dark regions of the sky featuring emissions solely due to atmospheric effects — we construct an atmospheric profile containing many different observations over the duration of WHAM's operation. Random samples are then taken from this atmospheric profile and subtracted from the observational data, creating a collection of resultant spectra for a given observation. We then construct an accurate emission profile after bootstrapping this process thousands of times, allowing for a non-biased treatment of random errors from the equipment itself. We are currently making efforts in reducing this method's computational intensity, so as to more effectively process WHAM's observational data and produce a large area map of galactic [NII] emission.

## P25 Testing Fluorinated Dipeptides Against *P. aeruginosa* Biofilms

**Student Researchers:** Ella Konrath '24; Anjolie Konrath '24

**Majors:** Molecular Biology; Molecular Biology

**Faculty Collaborator:** Olivia Hatton, Molecular Biology

*P. aeruginosa* (*P.ae*) is an opportunistic pathogenic bacterium that commonly infects the lung of patients with cystic fibrosis (CF). *P.ae* creates robust biofilms, which make it difficult for immune defenses and antibiotics to affect the bacteria. *P.ae* biofilms in the CF lung can lead to an inflammatory response resulting in tissue damage and eventual lung failure. A global initiative, known as the Distribute Drug Discovery (D3) project, has discovered that the modified amino acid (S)-4F-phenylalanine (4F), and its analog, (S)-2F-phenylalanine (2F), effectively inhibit the formation of *P.ae* biofilms. However, the toxicity of these compounds in mammalian cells motivated the creation of 160 prodrugs of 4F and 2F, with the aim that these prodrugs — unlike the active compounds 4F and 2F — display selective toxicity against *P.ae*. Overall, our aim was to study the efficacy of these prodrugs — specifically compounds 2, 3, 5, and 42 — against *P.ae* biofilm formation. First, we evaluated whether these compounds inhibit biofilm formation or *P.ae* growth and determined the half-maximal inhibitory concentration (IC<sub>50</sub> value) for each prodrug and its corresponding active compound. Second, we examined if these prodrugs could disassemble *P. ae* biofilms. Third, we examined if these compounds act as anti-metabolites by testing if L-phenylalanine rescues biofilm formation by *P.ae*.

## P26 Synthesis and Analysis of Benzyne Reactivity with Dewar Dihydropyridine

**Student Researcher:** Marina LeVarn '24

**Major:** Chemistry

**Research Collaborators:** Minh Pham '23; Anh Do '23; Naomi Leadbeater '24

**Faculty Collaborator:** Jessica Kisunzu, Chemistry and Biochemistry

Benzyne is a highly reactive and strained organic molecule containing a triple bond. Due to its high strain, benzyne can be used in organic synthesis to create a multitude of new and interesting molecules such as heterocycles. Heterocyclic molecules are important for use in pharmaceuticals and biochemical research<sup>1</sup>. The discovery of new heterocycles is imperative to further research in biochemistry and medicinal chemistry. Benzyne has been used in synthesis by groups like the Kobayashi and Krow labs. However, researchers have not fully studied benzyne interactions with azabicyclic molecules, which are also highly strained and reactive. In the Kisunzu lab, we aimed to address this gap and studied heterocyclic product formation by reacting benzyne with derivatives of Dewar dihydropyridine. The reactions were run under varying conditions changed for optimization, and then analyzed using <sup>1</sup>H NMR and LCMS Mass Spectroscopy. In our hands, the highest quantitative yield obtained for this heterocyclic product via NMR was 20.37%, run for 24 hours at room temperature using an ethyl carbamate of Dewar dihydropyridine. In the future, we hope to optimize the reaction and obtain a higher yield of product and do so with the aid of computational synthesis.

- 1) Jampilek J.; Heterocycles in Medicinal Chemistry. *Molecules* **2019**, 24(21):3839.
- 2) Himeshima, Y.; Sonoda, T.; Kobayashi, H. Fluoride-induced 1,2-elimination of o-trimethylsilylphenyl triflate to benzyne under mild conditions. *Chemistry Letters* **1983**, 12, 1211-1214.

## P27 Outdoor Campuses in Higher Education: Resources, Opportunities, and Best Practices

**Student Researcher:** Aidan Luter '24

**Major:** Economics

**Faculty Collaborator:** Juan-Miguel Arias, Education

Higher education institutions such as the University of Denver, Colorado State University, and soon Colorado College utilize remote outdoor campuses to deliver outdoor and environmental programming to students in place-based, residential settings. However, the resources needed, the opportunities provided, and the best practices for these remote campuses to run sustainably and effectively have not been fully explored. Through qualitative and quantitative analysis, this project seeks to identify the most effective offerings, formats, logistics, and outcomes of interest for these campuses and programs. Through a comprehensive review of existing literature and case study research, we explore current best practices for impacting students and stakeholders in meaningful ways from economic, accessibility, and equity standpoints. To deepen this analysis, we also conducted information-gathering interviews with stakeholders at Colorado College and other institutions with "mountain campus" offerings; specifically, the Kennedy Mountain Campus of the University of Denver and the Mountain Campus of CSU. Implications and suggestions based on the current state of the field in terms of outdoor and environmental programming in higher education will be presented.

## **P28 ClpP Activator (Lee4206) Causes Vancomycin/Lee4206 Cross-resistance in Heteroresistant *Staphylococcus aureus* Mu3**

**Student Researcher:** Sonia Jugal '25

**Major:** Organismal Biology and Ecology

**Research Collaborator:** Christine Dunn

**Faculty Collaborator:** Cydney Johnson, Infectious Diseases – St Jude Children’s Research Hospital; Jason Rosch, Infectious Diseases – St Jude Children’s Research Hospital

Bacterial heteroresistance causes a significant challenge to treating human *Staphylococcus aureus* infections, as the surviving subpopulation can regrow. Since heteroresistant mechanisms are not hereditary, it is difficult to study and develop drugs to combat the phenotype. As one method to study heteroresistance, we focused on ClpP. ClpP is a protease that has been shown in MRSA *S. aureus* to reduce vancomycin susceptibility when inactivated. (Xu et al., 2023). We hypothesized that an activation of ClpP would break down the bacterium and make heteroresistant strains vancomycin susceptible. In this experiment, I exposed *S. aureus* Mu3 to a ClpP activator (Lee4206) for 24 hours and then completed a vancomycin minimum inhibitory concentration (MIC) assay. The addition of Lee4206 increased Mu3 growth, making it tolerant to vancomycin. I then took isolated colonies that survived on a vancomycin concentration greater than Mu3’s MIC (2µg/mL) and tested their MIC to vancomycin and Lee4206 after being grown without any antibiotic pressure. Colonies previously exposed to Lee4206 were resistant to both vancomycin and Lee4206. We hypothesize that this cross-resistance developed from a mutation to the cell wall to prohibit Lee4206 from entering the cell during initial exposure. Further testing is currently needed to identify the mutations that resulted in this cross-resistance.

References: Xu, L., Henriksen, C., Mebus, V., Guérillot, R., Petersen, A., Jacques, N., Jiang, J. H., Derks, R. J. E., Sánchez-López, E., Giera, M., Leeten, K., Stinear, T. P., Oury, C., Howden, B. P., Peleg, A. Y., & Frees, D. (2023). A Clinically Selected *Staphylococcus aureus* *clpP* Mutant Survives Daptomycin Treatment by Reducing Binding of the Antibiotic and Adapting a Rod-Shaped Morphology. *Antimicrobial agents and chemotherapy*, 67(6), e0032823. <https://doi.org/10.1128/aac.00328-23>.

## **P29 Rights of Nature: Motivations and Strategies for Achieving Local Success in Colorado**

**Student Researcher:** Sophia Radday '24

**Major:** Environmental Studies

**Faculty Collaborator:** Mike Angstadt, Environmental Studies

This research explores the emerging legal paradigm of “Rights of Nature” in Colorado and the motivations behind its adoption across the state. By examining the framework of Rights of Nature and what its implementation requires, this research investigates the arguments and incentives that drive the establishment of legal rights for natural entities. Through an analysis of existing Rights of Nature laws in various cities across the United States and countries around the world, this research explores the legal and environmental potential of Rights of Nature and addresses how this concept can spread to higher forms of governance. Focusing on case studies of Crestone and Nederland, the primary research question centers on these towns’ successes in enacting Rights of Nature resolutions at the local level. By drawing on qualitative research methods including in-depth interviews and document analysis, this research reveals the many steps, collaborative efforts, and key motivations and strategies that leads to the achievement of Rights of Nature initiatives. As a result, this research reveals that when creating Rights of Nature laws, the process is naturally expedited in environmentally focused areas and that doing so leads to increased citizen awareness of environmental issues.

## **P30 Climate-Readying Colorado's Water Courts: Pursuing Resilience and Procedural Equity**

**Student Researcher:** Zoey Roueche '24

**Majors:** Environmental Studies and Political Science

**Faculty Collaborator:** Mike Angstadt, Environmental Studies

In Colorado, climate change is increasing water scarcity, reducing streamflows and snowpack, and altering hydrological cycles. These factors, in combination with a growing population, increase pressures on the state's water resources. In Colorado, all major disputes regarding water resources are currently resolved through a system of water courts; thus, they are crucial in preparing for and reacting to changes in water resources. We investigate how the impacts of climate change are being addressed by Colorado's water courts by examining the following question: *how do the structural and procedural aspects of Colorado's water courts influence their response to climate change?* After interviewing experts in Colorado water law ranging from judges to engineers and attorneys, ultimately, we found that many respondents are confident in Colorado water court capacity to address strains on state water resources, identifying systemic strengths including judicial support and work ethic, water basin divisions, use of data, and the non-adversarial nature of these courts. However, many respondents also questioned court capacity to directly address the impacts of climate change and remain equitable/accessible to those most at risk for drought in the state, suggesting opportunities to further refine the system.

## **P31 Identifying Cyanotype Prints, Investigating the Effect of Toning Time, and Addressing a Lack of Data on Midtones**

**Student Researcher:** Alessandra Tornelli '26

**Majors:** Physics: Materials Science and Studio Art

**Faculty Collaborator:** Amanda Bowman, Chemistry and Biochemistry

Cyanotyping is a form of light-sensitive photographic printing, offering artists the creative freedom to use various toning solutions and for various durations. A general lack of quantitative research exists understanding the impact of toning time, specifically on midtones. Additionally, we continue to question which analytical techniques best detect toners. We questioned the effect of toning time, examining three different toning durations on four commonly used toners: tannic acid  $C_7H_{52}O_{46}$ , gallic acid  $C_7H_6O_5$ , lead(II) acetate  $C_4H_7O_4Pb \cdot 3H_2O$ , and nickel(II) chloride  $NiCl_2 \cdot 6H_2O$ . Using IR spectroscopy, we found unique indication peaks to help characterize each toner. Using Raman microscopy, we found suggestions for new reactions and determined the 785 nm laser has greater potential in toner characterization. Using Reflectance microscopy, we discovered that toners are differentiable in color and toning times longer than the standard further shift a print's color, particularly in unsaturated and midtone regions. Additional research into extended toning times, reaction analysis, and investigating preservatives is crucial to confirm our data, continue exploring new findings, and preserve the art of cyanotyping. The significance of this research is underscored by its contribution to conservation, allowing professionals to understand the complexities of a photograph and prepare for its restoration and preservation.

### **P33 Analysis of Opinions on the Oil & Gas Industry Through the Conservation in the West Survey**

**Student Researchers:** Zoraiz Zafar '24; Mustafa Sameen '25

**Majors:** Mathematical Economics; Computer Science

**Faculty Collaborator:** Kat Miller-Stevens, Economics and Business and State of the Rockies Project

The oil and gas industry has experienced unprecedented growth in the United States in the last 20 years, the result of increases in population and per capita consumption of goods. However, this industry, in addition to fracking, is a complicated and often controversial topic because of the health and environmental risks associated with its practices. Thus, this study delves into the responses from 2018 to 2022 of the Conservation in the West Survey which aims to capture bi-partisan public opinions of registered voters in the Rocky Mountain West region on a variety of topics. Specifically, this study looked at whether respondents wanted the then-incumbent administration to focus on ensuring the safety and quality of the environment or on prioritizing domestic energy production. It found that, overall, there is greater support in the 8 surveyed states for focus on environmental issues than there is for domestic energy production through years 2018 to 2021, but that this support declines in states where fracking is legal and additionally declined in the year 2022, likely because of increased gas prices. Furthermore, the findings of this study indicate that female-identifying and non-white individuals are more likely to support an increased focus on environmental issues over domestic energy production.

### **P34 Deciphering Whispers from the Skies: Tracing Galactic Winds in the Heart of the Large Magellanic Cloud**

**Student Researcher:** Wanyan Yuan '24

**Major:** Physics

**Research Collaborators:** Anders Ripley '24; Natalie Van Tol '24

**Faculty Collaborator:** Dhanesh Krishnarao, Physics

Galactic winds are crucial to understand their host galaxies in terms of star formation rates, stellar masses, metal content, spatial distribution, and other observable properties (Veilleux et al., 2020). However, due to the complexity that they can be driven by multiple sources, it is hard to resolve and identify their components and their sources. The Large Magellanic Cloud (LMC), the nearby galaxy of the Milky Way, serves as an ideal target to analyze different galactic wind properties due to its proximity, face-on geometry, and abundance of multi-wavelength data. In this project, we mainly focus on the column densities and kinematic distribution of OI (neutral oxygen) galactic winds originating from the LMC. By analyzing data from the COS G130M grating on the Hubble Space Telescope, we specifically aimed at the absorption features of Si II (singly ionized silicon) and OI. We normalized the absorption continuum and employed VoigtFit to fit absorption lines and obtain values of velocities, column densities, and line widths. With these fits, we map both the column density and the weighted average velocity of the outflowing gas on the sky. Our maps, when combined with existing maps of other gas tracers across different wavelengths, will help us to connect our observed winds with sites of star formation and other features embedded in the LMC itself.

## **P35 The Research Behind the Effect of Light Pollution on Biodiversity**

**Student Researchers:** Natalia Segovia Soto '25; Sergio Hernandez '24

**Majors:** Economics; Business and Economics in Society

**Faculty Collaborator:** Guanyi Yang, Economics and Business

*Light pollution* is a growing problem that is having a negative impact on human health and biodiversity. Exposure to light pollution disrupts the circadian clock in humans, interfering with hormone production, cell regulation, and causing mood disorders. This exposure to artificial light at night has been linked with adverse health effects such as insomnia, depression, and obesity. Pregnant mothers over exposed to light pollution are more likely to give birth to infants with low birth weights and have a shortened gestational length compared to mothers with limited artificial light exposure. In biodiversity, light pollution can disrupt the natural behavior of big brown bats and white-tailed deer. Deers confuse artificial light with dusk, causing their cycle to be disrupted. Artificial light disorients bats during flight, making them more likely to collide with objects or predators, disrupting their breeding and migration patterns. Our research focuses on the negative externalities of light pollution as it relates to infant health and biodiversity.

## **P36 Challenges, Opportunities, and Practices in Payments for Water-based Ecosystem Services: Results of a Survey of Program Managers**

**Student Researchers:** Ewan Henderson '24; Sangay Mingyur '24

**Majors:** Environmental Science; Business, Economics and Society

**Faculty Advisors:** Mark Eiswerth, Economics and Business; Katrina Miller Stevens, Economics and Business

Water Funds are organizations that design and enhance financial and governance mechanisms which unite public, private, and civil society stakeholders around a common goal of contributing to water security through nature-based solutions and sustainable watershed management. As a starting point, we are conducting nationwide research on payments for water-based ecosystem services programs (PWES). We serve as neutral, objective researchers who collect information that can provide increased knowledge and value-added for the community of natural resource conservation program managers and researchers. We developed a survey with the goal of answering difficult questions like: What obstacles and challenges organizations have faced to create successful PWES or watershed conservation programs? What improvements can be made from an organizational standpoint for program design and administration, and how are payment values or funding levels determined? To this point, we have received responses from the representatives of nearly 40 different Water Fund organizations and PWES projects. This summer we began draft two papers that will analyze the data and do literature reviews of existing papers on the subject.



## **P37 Does estradiol rapidly facilitate the formation of dendritic spines in auditory neurons in songbirds when exposed to novel songs?**

**Student Researchers:** Raymond Fleming '24; Jeremy Lewis '24; Kaila Luell '24; Anna Matsui '25

**Majors:** Neuroscience; Neuroscience; Neuroscience; Neuroscience

**Faculty Collaborator:** Marcela Fernandez-Peters, Psychology

The growth of dendritic spines is emblematic of new synapses forming, and in the processes of cognition and memory, can be used as a measure of development. Previous research has demonstrated that novel song exposure can cause rapid dendritic spine-genesis within the avian secondary auditory cortex (caudomedial nidopallium, NCM). Other studies have found that brain estrogens strengthen auditory encoding in songbirds. Estradiol is linked to similar spine-genesis in the mammalian hippocampus, a region involved in learning and memory. Therefore, it was hypothesized that estradiol can facilitate novel song-evoked dendritic spine formation in the NCM. To test this, a song exposure protocol was mimicked from previous research, with the oral administration of estradiol or control prior to adult male zebra finches 30 m prior the exposure. Following exposure to sound treatment, male zebra finch brains were trans-cardially perfused and extracted. The tissue was histologically processed using a rapid Golgi staining followed by sagittal sectioning (100 um) and mounting. Z-stack images were acquired through the sections at 100x magnification. Neurolucida software was used to trace model the neurons in 3D space and quantified dendritic spine densities, branching and spatial distribution of spines. We successfully optimized this protocol to work on zebra finch tissue and study neuron morphology in the NCM. We identified at least three types of auditory neurons based on spine density, length and diameter of dendrites and will present preliminary data comparing four experimental groups. *References: Lauay et al. 2005, Adult Female and Male Zebra Finches Show Distinct Patterns of Spine Deficits in an Auditory Area and in the Song System When Reared without Exposure to Normal Adult Song; Remage-Healey et al. (2010): brain estrogens rapidly strength auditory encodings and guide song preference in song birds; Gilbert & Soderstrom (2013): novel sound exposure equates to centric spine formation Ball & Balthazart (2021): establishment of spinogenesis in mammalian hippocampus*

## **P38 Socio-Ecological Racial Equity Concerns of Greenways in Chattanooga, TN**

**Student Researcher:** Kylie Orf '24

**Major:** Environmental Studies

**Research Collaborators:** Socio-Ecological Role of Greenways in Urban Systems REU with NSF hosted by University of Tennessee at Chattanooga

**Faculty Collaborator:** Corina McKendry, Environmental Studies

Urban green spaces have significant implications for improving people's quality of life, this research examines equitable principles using Chattanooga greenways as a case study. We used interdisciplinary research involving social and ecological characteristics to explore the impact of urban greenways. Historical trends throughout history have shown there to be disproportionate access and quality of green spaces between communities with differing racial demographics. These patterns reveal that communities of Black and Brown individuals have been consistently neglected in terms of equal access to green space. Greenways are a type of public green space that serve as an interface between human and natural systems across urban environments and are a means of enhancing urban resilience. Urban greenways are multi-use networks of linear, open space corridors separated from roadways that provide opportunities for physical activity, recreation, and connectivity in urban environments. In the face of raising temperatures due to climate change, rapid urbanization, and a public health epidemic, greenways are one avenue of green infrastructure that may support healthy communities. This research investigates if concerns that have been seen in other environmental justice cases are present in Chattanooga. My research presents compelling evidence that points towards environmental justice concerns related to the greenways traversing predominantly Black and Brown communities. The very factors identified in the literature as barriers to usage, such as the absence of desirable amenities and limited access, are most pronounced in communities of color.

## **P39 Urban Transit-Oriented Development in Costa Rica: A Study of International Climate Finance and Partnerships**

**Student Researcher:** Malia Rivera '24

**Major:** Environmental Studies

**Minor:** Urban Studies

**Faculty Collaborator:** Corina McKendry, Environmental Program

International climate finance (ICF) has recently been a way to address the lack of resources in countries and cities of the Global South when it comes to climate change initiatives. However, ICF has been criticized for unequal power dynamics between donor and recipient countries that may continue historic cycles of subjugation. In contrast, this research highlights a successful case of ICF that is built around a dynamic of partnership and mutually beneficial results. By interviewing local government officials in Costa Rica's metropolitan area involved in a project under the EU's "Partnerships for Sustainable Cities" program, this research finds that ICF can be an effective way of bridging resource gaps that cities in the Global South face when furthering climate change initiatives, like transit-oriented development. This effectiveness depends on the ICF program's ability to center local knowledge and foster the exchange of experiences between donor and recipient actors. This model of ICF can be taken as an example for future programs that aim to increase the capacity of cities in the Global South and strengthen global coordination in the fight against climate change.

## **P40 JS Surfaces over Hexagons**

**Student Researchers:** Yousheng Tang '24; Zhiqi Yao '24

**Majors:** Mathematics; Mathematics

**Faculty Collaborator:** Jane McDougall, Mathematics and Computer Science

A minimal surface that locally minimizes its area, and can alternatively be defined as a surface with a mean curvature of zero. A Jenkins-Serrin (JS) surface is a specific type of minimal surface with a polygonal base and with unbounded height over the polygonal boundary – positive on some edges and negative on others. One famous JS surface is the doubly-periodic Scherk surface, discovered by Heinrich Ferdinand Scherk in 1834 and which has a square base. Using Sheil-Small Theory, we considered harmonic mappings onto hexagonal regions, thereby obtaining more general JS surfaces. We created a harmonic mapping onto a particular hexagon that appears to be a square. To construct it we start with a piece-wise constant boundary function that maps six arcs of the unit circle onto the vertices of the hexagon, and the Poisson integral formula extends it to a harmonic function of the unit disk onto the hexagon. We use a dilatation with four factors. By changing arc sizes and the location of dilatation zeros, we obtain a mapping onto a hexagon with prescribed interior angles, two of which are 180 degrees and four of which are 90 degrees. The side lengths are shown to form a square, and we obtain a new minimal surface that we call the "Hexasquare Minimal Surface." This JS surface differs from the Scherk surface by changing boundary heights more frequently, but shares many symmetries of the Scherk surface.

## **P41 Fascism in the New World: Receptions of Mussolini and Columbus in an Italian-American Newspaper**

**Student Researcher:** Lillie Gray '26

**Major:** Undeclared

**Minor:** Italian

**Faculty Collaborator:** Amanda Minervini, Italian

Existing studies of Mussolini's reception among Italian-Americans have examined the role of Generoso Pope: a pro-fascist newspaper owner and the father of New York City's Columbus Day Parade. The literature has neglected Pope's anti-fascist counterpart, Hector Chiariglione. In Pueblo, Colorado, Chiariglione established himself as both the "father of Columbus Day" and the founder of *L'Unione*, an anti-fascist newspaper. Beyond successfully lobbying the state and federal government to establish Columbus Day, Chiariglione promoted the symbol of Columbus through his newspaper. A staunch opponent of Mussolini, Chiariglione believed that Columbus embodied *L'Unione*'s democratic values. Today, *L'Unione* is only available on microfilm in the Pueblo Public Library. The windows look out over a large bust of Christopher Columbus, which Chiariglione helped commission in 1905. While *L'Unione* sinks further into oblivion, the Columbus statue commands perpetual attention. It is fitting that the symbol of Columbus should so eclipse the written beliefs of its first American champion. As *L'Unione* increasingly expressed its American identity, its politicization of the Columbus symbol paralleled the paper's weakening opposition to fascist sentiment. By examining Mussolini's reception in *L'Unione* throughout the interwar period, research conveys how American individualism engendered susceptibility to the fascistic use of historical symbols.

## **P42 Timing and Stopover Locations of Flammulated Owl (*Psiloscops flammeolus*) Migration**

**Student Researcher:** Laura Hinck '24

**Major:** Organismal Biology and Ecology

**Faculty Collaborator:** Brian Linkhart, Organismal Biology and Ecology

Flammulated owls (*Psiloscops flammeolus*) are a small insectivorous raptor native to the Western U.S.A and Mexico. Raptors in populations in the Manitou Experimental Forest leave their breeding grounds in late September to early October and arrive in wintering grounds in southern Mexico in late November to December. The exact migratory path of Flammulated Owls leaving the Manitou Experimental Forest was confirmed in 2016 in the paper "Migration timing and routes, and wintering areas of Flammulated Owls" by Drs. Brian Linkhart, Scott Yanco, and James Fox. Migration pathways were observed using GPS units attached to the backs of territorial males captured in the Manitou Experimental Forest study area. This device gives location data at selected dates that are expected to fall within migration. I analyzed data from six territorial males that began their fall migration in 2016-2021 to summarize the temporal patterns of Flammulated Owl fall migration and describe the general characteristics of stopover points.

## **P43 Test on Indoor Air Quality of Dormitories in University and Potential Solutions by the CO<sub>2</sub> Tracer Gas Method and Low-Cost Sensors**

**Student Researcher:** You Jung Ji '24

**Majors:** Biochemistry and Chemistry

**Research Collaborator:** Cathy Xiao '24

**Faculty Collaborator:** Sally Meyer, Chemistry and Biochemistry

Although the average American spends 90% of their time indoors, many people are unaware of importance of indoor air quality (IAQ). Since most dormitories are small and crowded, the impacts of indoor air pollution can be more severe. To improve IAQ in the dormitories, this study monitors particulate matter (PM<sub>2.5</sub>) and carbon dioxide (CO<sub>2</sub>) and compares IAQ with or without plants and humidifiers. The student living in the room is the source of the pollution. High concentrations of CO<sub>2</sub> and PM<sub>2.5</sub> correlate with lower cognitive ability and potential health concerns. This research uses low-cost portable sensors to measure CO<sub>2</sub> and PM<sub>2.5</sub>. Based on the results, Mathias double rooms with only one resident had both CO<sub>2</sub> and PM<sub>2.5</sub> concentrations above health levels which are 1000ppm and 35 µg/m<sup>3</sup> respectively. The use of humidifiers correlated with an increase in indoor PM<sub>2.5</sub> levels above the maximum exposure limit. This research also showed that the presence of C<sub>3</sub> or CAM plants might lower nighttime CO<sub>2</sub> concentrations, but they contributed to higher PM<sub>2.5</sub> levels. Despite the presence of plants in the room, the CO<sub>2</sub> levels were still at unhealthy levels. These findings emphasize the need to explore alternatives to enhance overall IAQ within dormitory settings.

## **P44 Simulating the Effects of Soil Properties and Crop Species on Crop Yield and Nitrogen Loss**

**Student Researcher:** Kate Lamkin '24

**Major:** Environmental Science

**Faculty Collaborator:** Mahesh Tapas, Dr. Randall Etheridge, Dr. Ariane Peralta, Research Experience for Undergraduates (REU): East Carolina University Water Resources Center

Despite the detrimental effects of excessive nutrients in waterways on ecosystem health, there are few hydrological models that accurately represent the movement of nutrients in coastal watersheds. This research used the *SWAT+* tool to simulate the effects of agricultural practices on nitrogen transport in the Tar-Pamlico River basin of eastern North Carolina. *SWAT+*, *Soil Water Assessment Tool*, is a system-based model that measures nutrient concentration and movement throughout a given watershed. Amongst excessive nutrients in waterways, nitrogen is one of the most impactful on terrestrial and aquatic health. Nitrogen concentrations that are too *low* can inhibit plant growth, while concentrations that are too *high* can cause detrimental overgrowth in waterways (e.g., harmful algal blooms). This research used *SWAT+* to simulate the effects of soil properties and crop species on yield and mass of nitrogen export. This project found novel results regarding the impact of soil properties on simulated crop yield and nitrogen export and can be used to develop hydrological modeling.

# RESEARCH POSTER PRESENTATIONS, ABSTRACTS P45-P64

## P45 Synthesis of Isoniazid-derived Metal Schiff Base Complexes

**Student Researcher:** Destiny McLaws '24

**Major:** Chemistry

**Faculty Collaborator:** Amanda Bowman, Chemistry and Biochemistry

Schiff bases are aldehyde or ketone like compounds where the carbonyl group is replaced by azomethine or imines, they are one of the most widely used organic compounds. Schiff bases are used as dyes, intermediates for organic synthesis or catalysts (1), and have wide applications in medical research, due to their antimicrobial activity and fighting of cancer cells. Research with other Schiff base ligands and synthesis of Schiff base metal complexes such as cobalt complexes, have found the antimicrobial activity is greater in metal Schiff base complexes when compared to the ligand alone (2). This research focuses on the synthesis and characterization of isoniazid derived Schiff base ligands as well as the synthesis of cobalt and manganese complexes with the synthesized ligand and characterization of air stable metal complexes. Characterization was done using Infrared spectroscopy,  $^1\text{H}$ -NMR, Ultraviolet-visible, Raman and  $^{13}\text{C}$ -NMR spectroscopies.  $^1\text{H}$ -NMR and  $^{13}\text{C}$ -NMR spectroscopies confirm successful synthesis of isoniazid derived Schiff bases.  $^1\text{H}$ -NMR of spectroscopy confirmed successful synthesis of the metal complexes, with spectra showing an expected number of peaks based on the symmetry of the complex. The Infrared spectroscopy of the ligands compared to complexes shows a shift in peaks and intensity that indicates a 1:2 metal complex formation.

## P46 Hyperphosphorylation Promotes Tau Liquid-Liquid Phase Separation in Alzheimer Disease

**Student Researcher:** Devlin Swanson '24

**Major:** Biochemistry

**Research Collaborator:** Chun K. Lim

**Faculty Collaborator:** Shige H. Yoshimura, Kyoto University Graduate School of Biostudies

Tau aggregation is one of the pathological hallmarks of Alzheimer Disease (AD). However, the initial phases of aggregation remain to be fully understood. A potential mechanism that has been proposed is liquid-liquid phase separation (LLPS), a process where biomolecules including proteins and nucleic acids form condensates which increase their local concentration. The increased local concentration may create a microenvironment where tau aggregation can initiate. LLPS is regulated by a variety of factors, including post-translational modifications such as phosphorylation. Meanwhile, misregulated hyperphosphorylation of tau has been implicated in the progression of AD. This work shows that hyperphosphorylation of the proline-rich and repeat regions create an uneven distribution of charge across the protein, leading to alternating positive and negative charge blocks. By introducing phosphomimetic mutagenesis, the effect of these charge blocks on LLPS was investigated. The results here imply that AD hyperphosphorylation may increase the propensity of tau to undergo LLPS. Further studies are required to accurately determine and compare critical concentrations and to establish significance.

## **P47 A Concise, More-or-Less Accurate, Only-Slightly-Exaggerated Guide to the Music and History of the Bowed Piano Ensemble**

**Student Researcher:** Forrest Tucker '24

**Major:** Music

**Faculty Collaborator:** Ryan Bañagale, Music

The Bowed Piano Ensemble (BPE) was a contemporary music group founded at Colorado College (CC) by former faculty member Stephen Scott. It consisted of ten musicians simultaneously playing a modified grand piano – but not playing on the keys. Rather, musicians plucked, strummed, and bowed the strings to bring Scott's original compositions to life. In the years since the retirement and passing of Scott, however, much information about bowed piano music and the BPE itself has been lost or is at risk of being forgotten. My research makes crucial strides towards the recovery, documentation, and preservation of this information. Central to my research are interviews with former BPE alumni I have conducted over the past two months, along with the retrieval and study of Scott's personal files, which are largely unarchived. Altogether, my research makes bowed piano music and the history of the Ensemble broadly accessible; documenting the personal stories and memories shared during interviews, along with archiving Scott's personal documents, allows future musicians and researchers to further explore the Ensemble's legacy.

## **P48 Combating the antibiotic resistance of *Pseudomonas aeruginosa* through synthesis of lectin targeted 4-FPhe prodrug**

**Student Researchers:** Maria Riek '25; Ty Kruger '25

**Majors:** Biochemistry; Biochemistry

**Faculty Collaborator:** Amy Dounay, Chemistry and Biochemistry

*P. aeruginosa*, a deadly bacteria common among those living with cystic fibrosis, is known for its strong antibiotic resistance. Chronic *P. aeruginosa* infections are characterized by biofilm formation, increasing the challenges of treatment. Two carbohydrate-binding proteins, LecA and LecB, have been identified as structural components of the *P. aeruginosa* biofilm that can be useful for targeted drug delivery. The compound 4-fluoro-L-phenylalanine (4-FPhe) exhibits antibacterial properties but also high cytotoxicity against mammalian cells and therefore would benefit from a prodrug approach. The prodrug design includes a LecA probe that can be attached to the 4-FPhe compound using a tetrapeptide linker. *P. aeruginosa* peptidases will then cleave the linker following the accumulation of the drug at the infection site allowing for full antimicrobial activity of 4-FPhe. Progress towards the effective synthesis of the prodrug compound will be reported.

## **P49 From 40 to 8: Unpacking the Economic Shifts Following Colorado's 2022 Concentrate Purchase Limit**

**Student Researcher:** Yasmine Khali '24

**Major:** Mathematical Economics

**Faculty Collaborator:** Santiago Guerra, Southwest Studies

In recent years, legislative changes surrounding the cannabis industry have become a focal point of economic discussions, particularly in Colorado. This research delves into the economic repercussions of Colorado's 2022 law which set stringent caps on the purchase of medical marijuana concentrates: limiting patients to a maximum of 8 grams per transaction from the previous 40 grams, and further restricting 18 to 20-year-olds to 2 grams, barring certain exceptions. By analyzing sales data spanning from 2014 to 2023, clear patterns emerge in both medical and recreational sectors. Notably, post-legislation years witnessed a marked decline in growth rates for medical sales, suggesting a significant impact on consumer purchasing behaviors. While recreational sales also saw a decline, it was less pronounced. This research not only illuminates the immediate economic aftermath of the 2022 cap but also raises pertinent questions about the broader implications for the cannabis industry, consumer choices, and state revenues.

## **P50 Early and late spring germination responses of *Liatris punctata* to heat and smoke**

**Student Researcher:** Erin Kim '24

**Major:** Organismal Biology and Ecology

**Faculty Collaborator:** Shane Heschel, Organismal Biology & Ecology

*Liatris punctata*, commonly known as the dotted gayfeather, is an herbaceous perennial of the Asteraceae family native to North America. While non-threatened, *L. punctata* plays a critical role as a food source to the threatened Pawnee montane skipper butterfly (*Hesperia leonardus montana*). This butterfly subspecies only inhabits the South Platte Canyon River drainage system in Colorado, specifically near Deckers and Cheesman Reservoir in dry, open Ponderosa pine woodlands. The flowers of *L. punctata* serve as the primary nectar source for the skipper (US Fish and Wildlife Service, 1992). Despite the importance of the *L. punctata* to the butterfly's preservation, the plant's germination requirements remain poorly understood. Previous studies have indicated an increase in germination due to butenolide, a compound found in smoke, which aligns with the species' occurrence in Ponderosa forest habitats, where occasional low-intensity fires naturally occur. Additionally, there has been few research on the role of gibberellins, a growth hormone naturally found in plants, in its germination response to fire. This study aims to better understand the optimal germination of *L. punctata* and its response to fire by using different combinations of smoke and heat treatments.

## **P51 Using GIS to map Colorado's Paleoenvironments**

**Student Researcher:** Charlie Hite '25

**Major:** Geology

**Research Collaborators:** Denver Museum of Nature and Science, Earth Sciences Division: James Hagadorn, Annaka Clement, Holger Petermann; Grace King '23

As a geology intern at the Denver Museum of Nature and Science (DMNS) this summer I worked for Curator of Geology, James Hagadorn, as well as postdoctoral researchers Annaka Clement and Holger Petermann. I worked on a variety of projects from organizing a recently donated collection of conodonts to doing paleontological field work in North Dakota. However, the project I spent the most time on was the museum's paleogeographic mapping project which aims to create satellite-like maps of Colorado throughout each time period of the past 500 million years ago. The geology department at the DMNS hopes that these maps will provide researchers with accessible, detailed, and highly accurate information on Colorado's paleoenvironments. My work was the first step of the process—mapping out sedimentary outcrops focused on the past 66 million years of Colorado history. Along with CC Geology '23 graduate, Grace King, I used ArcGIS Pro along with USGS data for Colorado and the surrounding states to find the relevant geologic formations for the specified time period. I then found peer-reviewed journals for each period with information on the ancient environment that the sedimentary formation corresponds to.

## **P52 Why So Emotional? An Exploration of the Use of Emotional Advocacy in Nonprofit Organizations**

**Student Researchers:** Charlotte Toogood '24; Layla Haji '25

**Majors:** Environmental Studies; Neuroscience

**Research Collaborators:** Jonathan Pierce; Jason Machado

**Faculty Collaborator:** Kat Miller-Stevens, Economics and Business

This research delves into nonprofit policy advocacy within the context of SB 19-181, an important bill that aimed to regulate the oil and gas industry in Colorado. Through examining the nonprofit organizations that participated in public hearings for SB 19-181, this study aims to provide insight into the characteristics of and tools used by these organizations to engage in policy advocacy. The research identifies a variety of advocacy tools, including narrative techniques featuring heroes, victims, and villains, as well as the use of moral values, technical data, and emotional appeals. This paper offers valuable insights into the strategies, challenges, and impacts of nonprofit advocacy and contributes to the broader understanding of the role of nonprofits in shaping public policy.

## **P53 Homology of Inner Kinetochore Protein Cbf2 may provide insight into Yeast Centromere Evolution**

**Student Researcher:** Patrick Hecht '24

**Major:** Molecular Biology

**Research Collaborator:** Jennifer Garcia, University of New England

**Faculty Collaborator:** Sara Hanson, Molecular Biology

The kinetochore is a protein complex that assembles on chromosomes at a location called the centromere, which ensures correct segregation of chromosomes during mitosis. Identifying the centromere for kinetochore assembly is an essential part of this process. Unlike other organisms, budding yeast have developed two different ways of identifying the centromere. Some species such as *Saccharomyces cerevisiae*, have a point centromere that is recognized by the kinetochore protein Ndc10 which then signals for kinetochore assembly. It is believed that in species with regional centromeres, kinetochore assembly happens independently of any Ndc10 function. Using bioinformatics, we identified Ndc10 homologs in a diverse range of yeast species, including those with regional centromeres. Our goal is to test the conservation of Ndc10 function in yeast with regional centromeres. We are establishing a protein-DNA binding assay that will test the ability of Ndc10 proteins belonging to regional centromere species to identify the centromere of *S. cerevisiae*. In addition, we are testing the ability of these Ndc10 proteins to complement the loss of *S. cerevisiae* Ndc10. Through these experiments, we aim to better understand the co-evolution of centromere and kinetochore structure and function.



## **P54 LLPS of Human Glucocorticoid Receptor**

**Student Researcher:** Will Gerash '24

**Major:** Biochemistry

**Research Collaborators:** David L. Bain, Dept. of Pharmaceutical Sciences, Univ. of Colorado, Aurora, CO 80045; Nate Kesti; Devlin Swanson

**Faculty Collaborator:** Margaret Daugherty, Chemistry and Biochemistry

Liquid-liquid phase separation is proposed as a means of regulating gene expression in the glucocorticoid receptor (GR) and related nuclear hormone receptor family. These proteins consist of a disordered amino-terminal domain (NTD), a DNA-binding domain, followed by a ligand binding domain (LBD). Consistent with the role of disordered domains, the NTD of a GR construct containing an ancestral LBD was shown to be essential for LLPS (Frank, F. et al., *Proc Natl Acad Sci.* **2021** 118: e2024685118). ParSe analysis of GR identifies two potential phase-separating regions in the NTD (Ibrahim et al., *J. Biol. Chem.* **2023** 299: 102801). Flow microscopy was used to probe the role of the NTD in LLPS in full-length human GR and a chimeric GRER, (containing the NTD and DBD of GR, with the LBD of the estrogen receptor). For both proteins, PEG8000 is required for coaservate formation. We find that the LBD influences coaservate formation. LLPS in GR is NaCl-dependent. Glucocorticoid response elements (GREs) decrease coaservate formation.

## **P55 Probing the Stellar Physics of White Dwarf and Neutron Star Binary Systems Using Gravitational Wave Signals**

**Student Researcher:** Liam Keeley '24

**Major:** Physics

**Faculty Collaborator:** Patricia Purdue, Physics

Thousands of neutron star-white dwarf and double white dwarf binary star systems will be visible to future space based gravitational wave detectors. We present work on using the binary population synthesis code COSMIC to simulate and study these systems. Previous COSMIC galaxy populations have focused on systems which evolve due to the radiation of gravitational waves only. In contrast, this summer we focused on mass transferring systems, which are binary star systems which evolve due to the transfer of mass from the lighter star to the heavier star. By studying mass transferring systems, we demonstrate the possibility for LISA observations to probe stellar physics like the type Ia supernovae of carbon white dwarfs accreting helium material and natal kick physics. While up to this point we have focused on smaller populations, we are currently working towards simulating an entire galaxy population.

## **P56 Re-Understanding Cardiac Health: Exploring the Bidirectional Relationship Between Cardiovascular Disease and Social Support**

**Student Researcher:** Lane Nelson '24

**Major:** Independently Designed Major in Critical Illness Studies

**Faculty Collaborator:** Eryn Murphy, Human Biology and Kinesiology

Background: Research validates that an individual's experiences of loneliness impact their physiologic outcomes, specifically cardiac function. Studies of younger adults indicate a correlation between social support and cardiac function, but less is understood about this relationship in older adults. This study aims to elucidate the relationship between social support, cardiac function, and incidence of cardiovascular disease among active older adults. Methods: We recruited 15 participants from Colorado College's Fit4Life group (avg. age = 74.9 years  $\pm$  6.32; n=8 females). Inclusion criteria included at least 65 years of age with the ability to walk short distances independently and provide informed consent. Participants completed a series of semi-balanced conditions, including eyes-open and eyes-closed balance after seated and supine rest. Concurrent data collection included cardiac output and associated measures. Additionally, the Duke Social Support Index (DSSI) was administered to each participant upon intake. This survey was scored and compared with incidence of cardiovascular disease and cardiac output metrics. Independent t-tests compared groups with and without cardiovascular disease, as well as top and bottom 50% of scores on the DSSI. Results: Results indicate a statistically significant difference between individuals that rank in the top and bottom 50% of DSSI scores and their incidence of cardiovascular disease. Additionally, there is a statistically significant difference between the individuals with and without history of cardiovascular disease and their level of social support. There was no significant difference across any groups in measures of cardiovascular function. Conclusions: These results confirm the bidirectional relationships between cardiovascular disease and social support, even among well-supported older adults. Further research is warranted to investigate the relationship between social support and metrics of cardiac function. Clinicians should incorporate experiences of loneliness and social support into more holistic understandings of cardiac health.

## **P57 Generalized Rosette Harmonic Mappings and Minimal Surfaces**

**Student Researcher:** Conor Wellman '25

**Majors:** Mathematics and Computer Science

**Faculty Collaborator:** Jane McDougall, Mathematics

Harmonic Mappings are univalent functions of a single complex variable, each having an analytic and coanalytic part. We expand upon the family of Rosette Harmonic Mappings discovered through research with CC alums Sohair Abdullah '19 and Lauren Stierman '21. These mappings are defined using hypergeometric functions and have  $m$ -fold radial symmetry for  $m \geq 6$ . We define Generalized Rosettes with parameter  $q$ , where  $0 < q < 1$  and  $q\pi$  is the measure of the exterior angle of the nodes of the analytic and co-analytic parts. Using a Weierstrass Representation, we define a family of minimal surfaces called the Generalized Rosette Surfaces. At small values of  $q$ , these surfaces approximate the classical minimal surface known as Enneper's Surface, creating a link between this classical surface and the Rosette Minimal Surfaces.

## **P58 The re-establishment of a Ponderosa pine forest: a multi-scale retrospect of the Waldo Canyon fire, CO**

**Student Researchers:** Sydney Morris '24; Chris Burich '24; Charlotte Pulido '24; Liam Keilty '25; Theo Ollier '26  
**Majors:** Organismal Biology and Ecology; Environmental Studies; Environmental Science; Organismal Biology and Ecology; Organismal Biology and Ecology  
**Research Collaborator:** Cyndy Hines, State of the Rockies

In recent decades, the number of forest fires occurring in the western United States has significantly increased due to fire suppression and climate change (Chapman *et al.*, 2020). As anthropogenic warming continues, wildfire trends are expected to increase in severity and size (Chapman *et al.*, 2020). One area specifically vulnerable to these changes is the Rocky Mountain West, where long periods of drought and rising temperatures across most elevations have been correlated with an increase in wildfire occurrence (Carter *et al.*, 2019). Global warming in the West is predicted to cause a shift from an infrequent, high severity fire regime to a novel fire regime in which high severity fires burn more often and affect larger areas (Westerling *et al.*, 2011). These high severity fires can be extremely detrimental to forest types that have not historically experienced high intensity fires, leading to a low likelihood of forest regeneration and the development of novel post-fire ecological trajectories (Haffey *et al.*, 2018). A dominant forest type in the West, ponderosa pine is poorly adapted to regenerate in large patches of high severity fire due to its lack of serotinous cones, inability to maintain long-lived soil seedbanks, and shade-intolerance in the presence of flora that outcompete ponderosa pine in these conditions (Rother & Veblen. 2017). Much of Colorado's Front Range, including the Waldo Canyon, have historically been dominated by ponderosa pine forests (Brown *et al.*, 2015). This summer, we conducted a demographic study of ponderosa pine populations in the Waldo Canyon burn scar over 20 years after the fire occurred. In this study, we attempt to predict the Waldo Canyon landscape post 2020 fires by analyzing the presence or absence of ponderosa pine on North vs South facing slopes.

## **P59 Leave it to Beaver: Assessing the Potential for Beaver Restoration in the Fountain Creek Watershed**

**Student Researcher:** Jasmine Sone '24  
**Major:** Environmental Science  
**Faculty Collaborator:** Charlotte Gabrielsen, Environmental Studies

The western United States is becoming drier due to climate change, and Colorado has recently seen unprecedented droughts and wildfires jeopardizing towns and habitats. To species mitigate the impacts of these extensive alterations to the landscape, there is a growing focus on the possibility of utilizing beavers as a nature-based solution. As ecosystem engineers, they can establish and sustain healthy, diverse river ecosystems. By constructing dams, beavers facilitate the formation of wetland ecosystems, hence fostering an increase in diversity and improving the water quality. Moreover, due to their capacity for water retention, beaver wetlands exhibit resilience against droughts and wildfires. This study aims to evaluate the viability of beavers as a means of stream conservation and restoration within the Fountain Creek Watershed, which is susceptible to drought and wildfires. The Beaver Restoration Assessment Tool (BRAT) was utilized as the primary instrument to evaluate the suitability of beavers as agents for stream conservation and restoration. Our analysis revealed that stream segments with a substantial capacity to facilitate beaver dams are predominantly located in the northwestern sector of the watershed. Conversely, the remaining areas within the region exhibit a limited capacity to support beaver dams.

## **P60 Artificial Intelligence Tool Optellum Outperforms Traditional Lung Cancer Prediction Model BRODERS**

**Student Researcher:** Ian Johnson '24

**Major:** Neuroscience

**Research Collaborator:** Eric Grogan, Department of Thoracic Surgery at the Vanderbilt University Medical Center

Lung cancer claims more lives than any other malignancy, with 238,340 annual deaths worldwide. While improvements in lung cancer screening have led to decreased mortality in high-risk populations, it has also led to a dramatic increase in the detection of indeterminate pulmonary nodules (IPNs). Analysis of IPNs often requires biopsy that are costly and present added procedural risks; thus, patients would benefit significantly from the development of an accurate noninvasive risk predictor of IPNs. Radiomic tools that analyze nodule features such as texture, density, and volume are being developed as one such noninvasive predictor. In the present study, radiomic analysis was applied to a cohort (N = 450) of patients presenting with nodules posing significant diagnostic challenge. Previously validated traditional radiomic tool BRODERS and novel AI-based Optellum analysis was performed on patient CT scans with Optellum (AUC = 0.68) performing significantly better than BRODERS (AUC = 0.52). Optellum's performance is unprecedented, being the first predictive model applied to this cohort to produce accurate predictions. These results indicate that Optellum and other related AI tools may provide the most predictive value for clinicians, especially when examining clinically difficult cases.

## **P61 Technology Mediated Disclosure of Sensitive Information**

**Student Researcher:** Kathleen Shea '24

**Major:** Computer Science

**Faculty Collaborator:** Lana Yarosh, Fernando Maestre, Human Centered Computing for Social Good REU, University of Minnesota

This project aims to find ways in which technology is able to mitigate the burden of public stigma that people living with Human Immunodeficiency Virus (HIV) experience. Using participatory and speculative design principles, my advisor, Fernando Maestre, worked with this population to identify the ways in which they want technology to support them. After conducting co-design workshops, participants identified the need for technology to assist them in disclosing their HIV diagnosis. This led to the creation of an application prototype that allows people living with HIV to disclose their diagnosis, express their emotions, provide educational resources, and be explicit with what they need from their disclosure recipient. The study has recently concluded the piloting stage and has shown promising results in fostering supportive interactions during HIV disclosure. In particular, participants in the pilot (n=8) identified generalizability, customizability, access to educational resources, and user-friendly design as positive and important features of the application. Participants also identified ideas for future iterations of the app, which will be reflected in the user-study that will be conducted in the fall. Ultimately, the study aspires to expand the app's utility beyond HIV disclosures to address other sensitive topics that people find challenging to discuss.

## **P62 Stellar Scandal: Unveiling the Enigma of LI(N)ER-like Emission Profiles - Could White Dwarf and Subdwarf OB Stars Be the Culprits?**

**Student Researcher:** Owen Cox '24

**Major:** Physics (Astrophysics Emphasis)

**Faculty Collaborator:** Dhanesh Krishnarao, Physics

Galaxies are typically classified by their emitted radiation profiles into one of three main groups: active galactic nuclei (AGN), regions of active star formation, and low-ionization (nuclear) emission regions (LI(N)ERs). Our understanding of the source of LI(N)ER-like emissions is most incomplete. The radiation source of this ionized gas and the population of stars of these regions is poorly constrained. However, recent optical observations of the Tilted Disk in the Milky Way's center from the Wisconsin H-Alpha Mapper (WHAM) reveal similar emission line ratios to other LI(N)ER-type galaxies, giving valuable opportunity for study of LI(N)ERs. These observations counter previous assumptions that the stellar population of the central Milky Way resembles that of our stellar neighborhood. Here we will identify the conditions that create emission line ratios similar to observations, starting with individual stellar sources. Our initial parameter study will provide a fundamental framework to expand into more complex stellar populations and develop a fuller understanding of the ionizing radiation for LI(N)ERs. This structural understanding is essential to decipher the formation and evolution of all galaxies, and could illuminate even the relationships between AGN, galaxies with active star formation, and LI(N)ERs.

## **P64 Public Land Survey**

**Student Researchers:** Brigitte Arcoite '24; Lily Frost '25, Jesús Laras Rivas '24; Liam Mullen '25; Nathalie San-Fratello '25

**Majors:** Economics; Undeclared; Geology; Economics; Art: Design Studies

**Research Collaborator:** Cyndy Hines, State of the Rockies

Every year since 2011, the State of the Rockies project has administered the Conservation in the West Poll to gauge public opinion on conservation issues within the Rocky Mountain West. For the first time, the 2023 poll asked voters about their opinions on dark skies conservation. It turns out this is an important issue for a lot of people, with 70% of people expressing that seeing the stars at night is significant to them. During the summer of 2023 the Public Lands Survey team set out to understand why. The team spoke with 388 visitors and residents from the Rocky Mountain region at around 65 state parks, downtown areas, gas stations, and shops. The survey included four qualitative questions to build an understanding of both the personal significance of seeing the stars and concerns surrounding the current conservation/development and tourism dilemma. These questions were somewhat personalized to enable the team to draw out more intimate conversations and personal reflections. While on the surface the team carried out research surrounding the issue of conserving the dark skies in the Rocky Mountain region, what people shared tended to go beyond what the questions asked. Several people expressed difficulty answering the questions, perhaps because they were unfamiliar with the themes or had interpreted the questions differently. Respondents often used the language of light pollution to express and share other issues within their community. And there were some individuals who expressed that dark skies conservation was not significant or important to them. All of these situations exemplified the process of making sense. Why is (or isn't) seeing the stars important? In sharing these conversations, it became clear that the importance of conserving the night sky is complicated by several factors but is nonetheless worth discussing.

## P65 Investigating TGFb1 Signaling on SEMA7A and its Impact on Epithelial to Mesenchymal Plasticity

**Student Researcher:** Zachary P. Strugar '24

**Major:** Biochemistry

**Faculty Collaborator:** Kelsey Kines, BS

**Background:** Semaphorin7A (SEMA7A) has been shown to correlate with worse prognoses in breast cancer patients. This is significant due to the increase in SEMA7A expression during post-partum involution. TGFb1 is involved with the process of epithelial to mesenchymal plasticity and is known to have some signaling impact on SEMA7A because TGFb1 signals activate SP1, via the PI3K and AKT pathways and SEMA7A's promoter region includes multiple binding sites for SP1. **Material and Methods:** Five experiments were conducted to investigate the hypothesis. QPCR was run with 9 sample conditions (MDA231 PLKO TGFb1+ and PBS, MDA 231 KD4 TGFb1+ and -, MDA 231 KD6 TGFb1+ and PBS, MDA 231 WT SEMA7A+, TGFb1+, PBS) and one NTC. Each was run in triplicate for their respective targets (SEMA7A, TGFb1, GAPDH). A migration assay consisted of standard concentrations of MDA 231 PLKO, KD4, and KD6 cells added to trans wells in a 24-well plate. The cells sat at 37 degrees Celsius for 24 hours. Flow cytometry was performed by treating MDA 231 EMP cells with 5ng/mL PBS, 2000nM igG, 5ng/mL TGFb1, and 2000nM SmAb (SEMA7A monoclonal antibody) respectively. Each treatment was performed in quadruplicate. High contrast imaging was taken of MDA 231 WT cells that were plated on a 96-well HCl plate. Wells were treated with increasing concentrations of TGFb1 and SmAb as well as matching concentrations of PBS and igG. The plate was analyzed in the drug discovery lab after 24 hours. Western blots were created from lysates of MDA 231 WT, pLKO, SEMA7A KD4, and SEMA7A KD6 in triplicate. The WT cells were treated with either SEMA7A (5ug/mL), TGFb1(5ng/mL), or PBS(5ng/mL). The knockdown cells were treated with either TGFb1 (5ng/mL) or PBS (5ng/mL). **Results:** The migration assay demonstrated a significant decrease ( $P < 0.05$ ) in % area coverage when comparing MDA 231 pLKO control cells to SEMA7A KD4 cells. The SEMA7A KD6 cells were unchanged from the control indicating the possibility of a loss of knock down. QPCR upon MDA 231 WT yielded a significant increase in relative SEMA7A expression when treated with TGFb1 ( $p < .005$ ) and no significant increase in relative TGFb1 expression when treated with SEMA7A. TGFb1 treatment also increased the relative expression of ECAD ( $P < 0.001$ ) but caused no change in Vimentin. QPCR run on MDA 231 pLKO, SEMA7A KD4, and SEMA7A KD6 revealed a significant decrease in relative SEMA7A expression when the knockdowns were compared to the pLKO control ( $p < 0.0005$ ). However, when treated with TGFb1, the knockdowns did experience a significant increase in relative SEMA7A expression. High contrast imaging demonstrated a significant decrease in ECAD+ Vim+ hybrid phenotype cell percentage when comparing control to a SmAb treatment ( $P < 0.005$ ). Furthermore, there was a decrease in ECAD+ Vim- cells and an increase in ECAD- Vim+ cells ( $P < 0.005$ ). Flow cytometry revealed a significant increase in ECAD+ Vim+ hybrid phenotype cell percentage when comparing control to TGFb1 treatment ( $P < 0.005$ ). **Conclusions:** TGFb1 signaling may occur upstream of semaphorin7a triggering upregulation of the protein. Treating MDA 231 cells with TGFb1 significantly increases the percentage of ECAD+ VIM+ cell phenotypes. Blocking SEMA7A expression with SmAb causes a significant decrease in ECAD+ VIM+ cells. Treatments with TGFb1 and SEMA7A on MDA231 do not cause a consistent statistical shift in populations of ECAD+ Vim- or ECAD- VIM+ cells. MDA 231 cells containing a SEMA7A KD vector have a lower aptitude for migration when compared to a pLKO control. **Acknowledgments:** Funding provided by Colorado College Thanks to Lauren Cozzens BS. and Heather Fairchild MS. for training assistance. High contrast imaging and MDA 231 EMP cells were provided by the CU Anschutz Drug Discovery Lab.

# NON-PRESENTATION RESEARCH

## A Quantitative Analysis of Bail Decisions

**Student Researcher:** Emma Fowkes '24

**Major:** Sociology

**Faculty Collaborator:** Gail Murphy-Geiss, Sociology

This research project uses data provided by a combined district and county court in Colorado to examine if any demographic factors, across defendants, are associated with the assignment of higher bail bonds. The dataset covers all bail decisions from July 1, 2022 to December 31, 2022, set by the magistrate primarily in charge of advisement hearings. SPSS was used to run bivariate tests of association between demographic variables and bail outcomes. T-tests and chi-square tests showed that bail amount was significantly correlated with defendants' race, as was the likelihood of being granted a personal recognizance bond. Compared to the overall average, three specific racial groups had higher bail amounts: Black, Hispanic, and Asian. The same groups were less likely to have personal recognizance bonds, meaning that a greater percentage of people in those groups had to pay their bail upfront for pretrial release. Since these bivariate tests do not control for the impact of case-related variables, additional multivariate regressions will be completed in Block 1 to see if the relationship between race and bail persists when defendants' charges are accounted for.

## Cataloging and Archiving Video Library of Compositions

**Student Researcher:** Hanna Freitas '25

**Major:** Music

**Faculty Collaborator:** Ofer Ben-Amots, Music

I worked over the summer with Professor Ofer Ben-Amots to organize his collection of videos from live performances, as well as studio recordings. Included in my work were the sorting of his large amount of video and audio recordings and categorizing them by genres. For example, works for orchestra, for chamber music, vocal works, instrumental, and so on. Following that cataloging phase, I was tasked with the uploading of said videos onto his YouTube account, and to attach titles, descriptions, and other data and information. In order to complete the process, I organized the various videos into playlists, by genre, to enable easier search of the composer's catalog. At this point, I am still working on the project, mainly by doing more cataloging and backup copies of the materials. From there, what's remaining is the final copying of those videos onto removable flash drives in order to submit them to the National Library of Israel in Jerusalem where my professor has his own musical archive.

## Historifans

**Student Researcher:** Lydia Hussain '24

**Major:** History

**Faculty Collaborator:** Danielle Sanchez, History

This summer I assisted with the editing and publication of documents on [Historifans.org](http://Historifans.org), a website that Publishes articles that analyze the historical implications of pop culture. Here, I managed their social media, Edited articles on WordPress, interviewed sources, and wrote an article for publication. With this position I was able to expand my knowledge and abilities on editing, writing for journalism, and researching history via Contemporary objects and films. I was also able to connect with many people in museums, academics, and researchers in collections and more. Moreover, I worked closely with Dr. Danielle Sanchez in the history Department, who was a wonderful mentor and allowed me both guidance and independent work when needed. Some of my specific personal projects included, ensuring that social media was engaging and developing an article on historic Barbie items at History Colorado, which I did by interviewing the collections team and Analyzing the items themselves.

## **Distant Comradeship, Intimate Rivalry: Depiction of the Soviet Union in Lianhuanhua Art During the Sino-Soviet Split**

**Student Researcher:** Yuexiang Gabriel Hao '24

**Major:** History

**Faculty Collaborator:** John Williams, History

This research is an examination of the Soviet image in Lianhuanhua, a popular modern art form in China after the Sino-Soviet split in the late 1950s until the end of the Cultural Revolution in 1978. There was no previous research found on this certain topic, therefore conducting this research can help connect popular entertainment and contemporary international politics. Several Soviet subjects were examined, ranging from early Bolshevik revolutionaries, Soviet comrades, and Soviet enemies, or as China called them, "Socialistic imperialists." The materials for this research are collected from libraries and markets, as illustrations of two kinds of sources: what is considered representative, and what commoners loved to read. As a result, we can find a pattern of Soviet representation in Lianhuanhua from the late 1950s to 1978: the image of the Soviet Union in Lianhuanhua after the Sino-Soviet split, especially during the Cultural Revolution, is an intended twist of the contemporary Soviet Union. The Chinese government attempted to reinforce the splendid history of Lenin, Stalin, and the Soviet people under their administrations as an artistic impression. The evil part of the Soviet Union to China, namely the Khrushchev and Brezhnev administrations, was erased.

## **"Unveiling Galactic Winds: A Comprehensive Study of Neutral and Ionized Gas Outflows in the Large Magellanic Cloud"**

**Student Researcher:** Anders Ripley '25

**Major:** Physics

**Research Collaborators:** Natalie Van Tol '25, Wanyan Yuan '25

**Faculty Collaborator:** Dhanesh Krishnarao, Physics

Galactic winds consist of neutral and ionized gas that is expelled from galaxies at high velocities. These winds are known to influence the environment around a galaxy along with properties within the galaxy, such as star formation. Galactic winds are driven by a combination of radiation from hot stars, supernova blast waves, cosmic rays, galactic nuclei. The winds originate from local sources that cluster on < 10 pc scale, stars and black holes, yet spread to beyond 100 kpc. Despite the importance of these winds, the physics that describes their behavior and impacts is not well understood. The multitude of processes occurring on such small scales requires an observational approach that resolves the winds at the proper scale and correlates them with the driving forces. We are utilizing COS spectra from the Hubble Space Telescope of stars in the Large Magellanic Cloud (LMC) to comprehensively map the galaxy-scale outflows in neutral and ionized gas. Because the LMC is so close to us in the universe, we can match properties of the gas that is ejected from the galaxy to the location of individual stars and sites of star formation where winds can originate. Our analysis will contribute to a larger study piecing together gas of different temperatures and ionization states to fully understand galactic winds.

## **Relationship between News Uncertainty and Trading Volume**

**Student Researcher:** Riasat Omar '24

**Major:** Economics

**Faculty Collaborator:** Oghuzan Batmaz, Economics and Business

This paper explores the effect of media generated uncertainty on the stock market's trading volume. The Equity Market Uncertainty Index was used as a proxy for newspaper generated uncertainty about the markets. Furthermore, the paper uses market returns, macroeconomic metrics and day of the week variables to explain trading volume. Model-wide tests show that errors are non-normally distributed which impedes the forecasting power of the model. Results show with high statistical significance that changes in EMU do not have high forecasting power on trading volume. However, market crashes affect trading volume the most and price declines are negatively correlated with trading volume. Price jumps affect trading volume though not as forcefully as price declines.



## **Camera trap survey of carnivore occupancy patterns in the Manitou Experimental Forest**

**Student Researcher:** Isabel DeVito '24

**Major:** Organismal Biology and Ecology

**Faculty Collaborator:** Brian Linkhart, Organismal Biology and Ecology

Diverse carnivore communities are important for maintaining top down controls and protecting ecosystem function. However, interspecific competition and predation by other carnivores help maintain differential habitat use, activity patterns and sometimes avoidance behaviors between carnivore species. Smaller carnivores have been found to avoid larger dominant species both spatially and temporally. Research on carnivore guild co-occurrence and interspecific competition in montane forests in Colorado is limited, and no previous carnivore occupancy studies exist for the Manitou Experimental Forest, a ponderosa pine forest managed by the US Forest Service. To investigate interspecific relationships between medium and large carnivores, 30 motion-triggered infrared game cameras were set up in the MEF. To maximize likelihood of photographing carnivores that occur at low densities, cameras were placed along trails or game paths within a sampling grid with minimum distance of 500 meters between cameras. Multi-species occupancy models will be used to analyze approximately 3 months of data and identify patterns in spatial and temporal habitat use by carnivore species.

## **Examining the Impact of Light Pollution on Economic Development and Community Well-being in the Southwest Region: A Pilot Study**

**Student Researcher:** Kira Smith '25

**Majors:** Museum Studies; Creative Writing

**Faculty Collaborator:** Rebecca Tucker, Museum Studies

Historically, wealthy male collectors have dominated the world of art collection and philanthropy. Consequently, the majority of academic research is focused on the contributions of male-identifying collectors. There is limited research that provides insight into the perspective and contributions of female collectors. Alice Bemis Taylor is an example of a woman who managed to glean success and contribute to a historically male-dominated field. Taylor, a prominent collector and founder of the Fine Arts Museum in Colorado Springs, has never been studied for her substantial contributions to the field. Our research aims to illuminate the financial and social climate surrounding the few female collectors that rose to prominence during the late 19th and 20th centuries. Through the analysis and comparison of three prominent female collectors, we contextualize the extensive work of Alice Bemis Taylor. Taylor possessed unique qualities as a collector and philanthropist, as well as tactics she shared with other female collectors in acquiring art and establishing legitimacy. These insights bring new light to a wildly exclusive body of research about philanthropy and the art market.

## **Investigating Galactic Winds in the Large Magellanic Cloud: A Stellar Feedback Odyssey**

**Student Researcher:** Natalie Van Tol '25

**Major:** Physics

**Research Collaborators:** Anders Ripley '25; Wanyan Yuan '25

**Faculty Collaborator:** Dhanesh Krishnarao, Physics

In order to study how galaxies evolve, we need to have a firm understanding of stellar feedback processes. The Large Magellanic Cloud (LMC) is a perfect galactic candidate for developing a detailed understanding of its stellar feedback, due to its nearly face-on orientation, the abundance of star formation, and a massive galactic wind that is separable from Milky Way gas. We will create a detailed spatial map of the LMC's galactic wind –the gas ejected from the LMC through stellar feedback. Drawing from a catalog of 140 historical observations from the Hubble Space Telescope's COS spectrum, we fit the absorption lines of OI, SiII, and SiIII to determine gas velocity and column density, and filtered out the OI gas with velocities above 100km/s and below 50km/s to separate it from ambient gas in the LMC and Milky Way, focusing on this important tracer of neutral gas. Once our results are combined with the results from collaborators, we hope to fully resolve the galactic winds of the LMC, allowing for a clear understanding of the mass of gas ejected, and its ionized gas properties.

# What are internships?



Internships provide high-impact experiences that allow students to demonstrate their ability to apply the knowledge and skills they are learning in the classroom to workplace settings. Through these applied learning experiences students enhance their existing skill set, expand their professional network, and discern future career goals. Colorado College students participate in a wide array of internships in various roles and industries.

This summer over 80 students received Summer Internship Funding Awards, allowing them to participate in internship opportunities many of which remain unpaid or underpaid. Students who receive funding participate in prep programs, reflection activities, and ongoing support to enrich their internship experience.

Students also participated in the Colorado College Public Interest Fellowship Program, offering paid fellowships in Colorado's non-profit sector, and other Colorado College partnered internship programs with organizations such as Colorado Public Radio, and the Nature Conservancy.

To learn more about these programs, and more, visit: [www.coloradocollege.edu/careercenter/](http://www.coloradocollege.edu/careercenter/)

# INTERNSHIP PRESENTATIONS, SUMMARIES P1-P25

## **P1 Fountain Creek Watershed, Flood Control and Greenway District, Colorado Springs, CO**

Colorado College's Public Interest Fellowship Program

**Student Intern:** Aidan Boyd '25

**Major:** International Political Economy

As the Outreach Intern, my role was to support the visibility and education components of the District's mission. The District itself was established by the state of Colorado to protect the Fountain Creek Watershed (Palmer Lake to Pueblo), which is among the most threatened and controversial creeks in the entire country. I had the opportunity to educate children from 3-18 at various summer camps (including at fun places like the Cheyenne Mountain Zoo), schools, and volunteer programs on crucial issues related to water pollution, watershed health, and given the events of this summer, flood safety. I also helped coordinate the largest watershed cleanup in the state of Colorado (which is in the running for the largest in the US). On the visibility side, the District has struggled with the esoteric nature of water policy and the confusing nature of a quasi-governmental special district, which I helped to reduce through educational social media posts and short form video content to be used at meetings with the public and policymakers.

## **P2 One Colorado, Denver, CO**

Colorado College's Public Interest Fellowship Program

**Student Intern:** Sophia Lisco '26

**Major:** Undeclared

This summer, I had the opportunity to participate in a hybrid position as a Development Fellow at One Colorado, the state's leading advocacy organization dedicated to advancing equality for LGBTQ+ Coloradans and their families. One Colorado and their sister organization, One Colorado Education Fund, advocate for LGBTQ+ Coloradans and their families by piloting initiatives centering health equity, civic engagement, safe schools, and transgender equality. I worked within the development department to engage donors and facilitate multiple fundraising efforts. This experience includes organizing and managing volunteers at One Colorado's Pink Party during PrideFest, creating promotional materials for GiveOUT Day, and spearheading silent auction organization and outreach for the Prism Awards, One Colorado's primary fundraising event. I gained foundational knowledge about nonprofit organization and structure while developing my personal theory of change as an LGBTQ+ advocate. This valuable, hands-on experience has exposed me to the broader world of changemaking and will continue to guide me through my next career experience and beyond.

## **P4 Center for Applied NonViolent Actions and Strategies (CANVAS), Belgrade, Serbia**

**Student Intern:** Nicholas Bennett '24

**Major:** Political Science: International Relations

During my summer internship at CANVAS as an analytical research intern, I gained invaluable insights and experiences. Based in Belgrade, Serbia, I participated in daily Zoom calls, discussing activist plans in countries like Georgia. The energetic and creative office atmosphere in Belgrade was inspiring. A significant part of my internship focused on preparing for the CANVAS Summer Academy, where I, along with fellow interns, managed sign-ups and notifications for sessions featuring expert speakers. This work was pivotal for the academy's success. Later, we collaborated to summarize session learnings into real-world case studies, contributing to a comprehensive document shared with select award recipients within CANVAS. Throughout the internship, my team contributed to weekly conflict and activism updates for the website. Moreover, I conducted an extensive case study on LGBTQ+ and trans rights, indigenous populations, freedom of assembly, and freedom of expression in Myanmar. This experience significantly improved my research and writing skills, enhancing my ability to locate unique and niche sources on social media. My time with CANVAS has been both academically and ethically enriching.

## **P5 Center for Applied NonViolent Actions and Strategies (CANVAS), Belgrade, Serbia**

**Student Intern:** Margalit Goldberg '25

**Major:** History-Philosophy

The Center for Applied NonViolent Actions and Strategies developed from a non-violent student movement led by Srdja Popovic and Slobodan Djindjic, which successfully overthrew the Serbian dictator Slobodan Milosevic. CANVAS now functions as a hub and support network for nonviolent activists around the world. This summer, I helped organize and run their annual conference called CANVAS Academy which held Zoom sessions on topics ranging from women's rights to navigating democratic transitions. I also participated in the workshops for activists currently strategizing the resistance against the military junta in Burma/Myanmar. The organization has a lot of connections and supporters who are kept in contact through a weekly newsletter with updates on political conflicts that is written and sent out by the interns. This internship introduced me to the nonprofit world and was also my first desk job. Living in Belgrade for six weeks was an incredible opportunity to be immersed into a different culture and experience a post-Yugoslav nation. <https://canvasopedia.org/>

## **P6 Modern Intimacy**

**Student Intern:** Christi Ashenden '24

**Major:** Education

Modern Intimacy is a remote sex therapy practice devoted to helping individuals and couples thrive mentally and sexually. Modern Intimacy also publishes several educational resources for improving intimacy and mental health, such as the Get Naked with Dr. Kate podcast, the Modern Intimacy blog, and courses on sexual wellbeing and healing. During my ten-week internship with Modern Intimacy, I drafted seven books on sexual and mental health topics, including family enmeshment, orgasms, kink, pornography, couples therapy, inclusive sex education, and consensual non-monogamy. I also met bi-weekly with the entire Modern Intimacy team to discuss clinical case questions, and I ultimately presented my own mock case. Over the course of my internship, I read nine books and dozens of research articles on sex and psychotherapy which deeply informed by writing on topics in therapy and sexual health. I am so grateful to have had the opportunity to collaborate with the Modern Intimacy community and to use my skills to promote inclusive sexual and mental wellness for all.

## **P7 Upward Bound, Houston, TX**

**Student Intern:** Erik “Smiley” Avalos ‘24

**Major:** Business, Economics, and Society

This summer, I had the opportunity to work with Upward Bound at Houston Community College where I served as a financial literacy tutor and an entrepreneur tutor for a group of 27 high-achieving high school students. The Upward Bound program aims to provide low-income and first-generation college-bound high school students with the necessary support and resources to succeed academically and ultimately pursue higher education. It was a transformative experience that combined education, mentorship, and empowerment. Our financial literacy program equipped students with essential life skills, teaching them about budgeting, saving, and making informed financial decisions. As an entrepreneur tutor, I had the privilege of influencing their entrepreneurial spirit and helping them inspire business ideas and plans. Throughout the summer, our students also built confidence in their abilities to take control of their financial futures and explore entrepreneurial opportunities. It was truly rewarding to witness their growth and enthusiasm.

## **P8 CreatorUp, Los Angeles, CA**

**Student Intern:** Campbell Beattie ‘24

**Major:** Film and Media Studies

During my remote internship at CreatorUp, a video production company, I had the opportunity to engage in various responsibilities that provided valuable insights into the creative industry. My tasks encompassed casting, the creation of pitch decks, and ensuring product quality. Working within a video production environment allowed me to witness the dynamic process of crafting compelling visual content. I particularly enjoyed the collaborative nature of my role, as I liaised with diverse teams to ensure smooth operations and the delivery of high-quality outputs. This experience enhanced my understanding of the intricacies involved in video production, from conceptualization to execution. Engaging remotely also sharpened my communication and organization skills, as effective coordination was essential for successful project outcomes. Overall, my time at CreatorUp has deepened my appreciation for the intricacies of video production and its broader implications within the creative landscape.

## **P9 University of Chicago, Organismal Biology and Anatomy; and Chicago Botanic Garden/Northwestern University, Chicago, IL**

**Student Intern:** Iván Beck ‘24

**Major:** Organismal Biology & Ecology

During this summer I conducted research at two separate laboratories in Chicago where I examined how octopus recruit arms in crawling motions and how small plant populations engage in extinction vortices. For my octopus research, I conducted detailed analysis that illuminated layers of motifs in terms of how larval octopuses recruit their arms to move in different directions. I have submitted an abstract and am awaiting approval for publication. For my other job, I examined the effects on small populations of endangered kittentail plants on the extinction vortex via inbreeding. Overall, both experiences gave me the opportunity to develop research skills as well as interpersonal skills both in the lab and for field research. With a publication hopefully upcoming, I look forward to completing the process of an entire research project and all the nuances that come with completing this.  
<https://oba.bsd.uchicago.edu/research>

## **P10 Aya Madre Healing Center, Iquitos, Loreto, Peru**

**Student Intern:** Denise Benitez '24

**Major:** Psychology

Aya Madre Healing Center is the first plant medicine retreat center in Iquitos, Peru to be fully owned and operated by an indigenous (Shipibo) woman. The owner, Maestra Estela, along with her family members, provide patients with holistic diagnoses and treatments that involve the use of Shipibo plant traditions and nature. Maestra Estela founded this center after working at other Ayahuasca centers owned by foreigners that did not respect the traditions of the medicine or the communities that carry this knowledge. People from around the world seek Maestra Estela due to her knowledge and lifelong experience with plants and practices that help people with physical and mental ills. I volunteered at Aya Madre for two months where I helped with translation, integration of guest experiences, managing reservations, website updates, maintenance of common spaces, and relaying messages between guests and staff. [Ayamadre.com](http://Ayamadre.com)

## **P11 US District Court, District of Utah, Salt Lake City, UT**

**Student Intern:** Greer Bleyl '24

**Major:** History

This past summer, I had the privilege of interning at the US District Court, District of Utah under the honorable Judge Dale Kimball. The District Court serves as Utah's primary federal court, where the vast majority of cases involving federal law are arbitrated. Accordingly, I was able to enjoy close exposure to these proceedings. This experience was an invaluable benefit to my goals because I was able to witness attorneys in action and learn about their day-to-day routine. I am a visual, hands-on learner who is most productive when I am able to witness topics firsthand. My close proximity to the legal system and the involved nature of my internship catered perfectly to my learning style. As a result, I became more knowledgeable throughout the summer. This knowledge has helped build a strong foundation for success in law school and beyond. Aside from watching trials and hearings, I also had responsibilities such as editing documents and assisting clerks in the Judges' chamber with administrative tasks. The experience I gained in this area will bolster my writing skills in classes here at CC as well as contribute to my ability as an attorney in the future. Overall, this internship has been one of the most productive experiences in my life. As a history major, I am fortunate that I was able to continue honing my writing skills over the summer. After all, my success throughout my senior year at CC will play an important role in earning a spot at a competitive law school. Furthermore, by applying myself this summer and learning skills relevant to the legal field, I am investing in my future and laying the groundwork for a career as an attorney.

## **P12 Thorne Nature Experience, Boulder, CO**

**Student Intern:** Sabine Blumenthal '24

**Major:** Environmental Science

This summer I had the opportunity to work at Thorne Nature Preschool as an assistant teacher. Thorne, based in Lafayette, CO, offers many different programs apart from their preschool, such as year-round mentorship and outdoor programming for underserved youth in the greater Lafayette area (Nature Kids), as well as summer camp programming for elementary school children (Eco-Explorers). As a teaching assistant with the preschool, I gained hands-on experience teaching children in an outdoor setting, joined a fantastic group of co-teachers who served as mentors to me throughout the summer, and built lasting relationships with my students and their families. Despite my lack of prior teaching experience, I was given much responsibility and support throughout the summer and have come out a much more capable and knowledgeable educator. My primary duties included keeping children safe during outdoor play, supervising after care and nap time, leading activities, and working with kids to build socio-emotional skills through nature. For anyone interested in teaching at nature-based preschools or learning more about preschool education in general, this is a terrific organization to work with!

## **P13 University of Colorado, Anschutz School of Medicine, Aurora, CO**

**Student Intern:** Charlotte Brown '26

**Major:** Biochemistry

This summer I worked at the University of Colorado Anschutz School of Medicine in the Immunology & Microbiology department. During my time I worked on perfecting some of my lab skills such as making buffers, doing titrations, and harvesting mice. I also worked on a personal project to determine if the use of an anti-CD19 antibody could induce downregulation of the CD19 surface antigen present on B cells. The idea behind this is that lower CD19 expression could help target central tolerance (the mechanism that prevents autoreactive cells from leaving the bone marrow) and therefore be a potential new drug mechanism to treat autoimmune diseases. To perform the experiments required for this project, I had to learn flow cytometry which allowed me to scan the cells I collected for certain antigens and therefore determine the level CD19 expression. Due to the short length of this internship I wasn't able to come to any clear conclusions but I hope to return next summer to continue my research!

## **P14 Burr Capital Advisors, West Hartford, CT**

**Student Intern:** Tucker Burr '26

**Major:** Economics

Over the summer, I had the opportunity to intern at Burr Capital Advisors. This boutique wealth management firm, located in West Hartford, Connecticut, was an ideal summer internship. Although there wasn't much structure and formal training, it was still a valuable learning experience, and it definitely got me more interested in the world of finance. The day-to-day was relaxed and usually consisted of sitting in on client meetings, shadowing partners, and learning about different investing tactics. Another facet of this firm was estate planning, where I learned about protecting assets and avoiding taxes when passing down an estate. Overall, this experience furthered my interest in finance and gave me a strong foundation for future internships and jobs following graduation. [www.burrcapital.com](http://www.burrcapital.com)

## **P15 Flying Pig Farm, Manitou Springs, CO**

**Student Intern:** Bryn Daney '24

**Major:** Philosophy

I had the honor of interning at the magical Flying Pig Farm over the summer, and it was one of the loveliest experiences of my life thus far. My days at the farm were filled with life, learning, and laughter. The beautiful flora and fauna there provided a space of wholeness and acceptance, with every breeze and buzz feeling like a big hug. I would arrive every day to a warm smile from Barak, the head caregiver of the farm, and many 'good mornings' from the hungry goats. Whether it be meditatively pulling weeds, creating cyanotypes with various plants, or moving a swarm of bees from a tree, I never knew what to expect when I arrived. But what I did know, is that whatever it was, it would always be met in connectedness and love. I am very grateful for the Flying Pig and everyone that makes it what it is!

## **P16 Flying Pig Farm, Manitou Springs, CO**

**Student Intern:** Addi Schwieterman '24

**Major:** Mathematical Economics

Flying Pig Farm is an urban farm that is focused on creating opportunities for community members to build relationships with the land. During the internship I was able to support community events hosted by Flying Pig while also working on the farm at Mountain Song Community School. We began the internship by alternating working at Flying Pig and Mountain Song in the mornings and developed the skill to identify all plants on these farms. We also supported workshops at Flying Pig and led programs for groups such as Generation Wild, TESSA, and the Community Prep School. In late June we transitioned to running farm camp at Flying Pig, where I was a counselor for the oldest group of students. There were three weeks of camp total and we had off weeks in between each session where we continued to work on the farm. During camp I was able to use the knowledge I had gained during the beginning of the internship to connect the campers with their environment at the farm. This Internship allowed me to develop a connection with Manitou Springs and build a relationship with the larger community surrounding Colorado College. [www.facebook.com/flyingpigmanitou/](http://www.facebook.com/flyingpigmanitou/)

## **P17 Westcliffe Center for the Performing Arts, Westcliffe, CO**

**Student Intern:** Tsering Dhondup '25

**Major:** Theater

The highlight of my internship at Westcliffe Center for Performing Arts (WCPA) was my involvement in a Shakespearean production of "Measure for Measure." It marked my first experience of getting involved in a complete Shakespeare production and the experience proved to be an educational milestone. I gained immense knowledge not only about the intricacies of Shakespeare's work but also about collaborating with individuals of diverse age groups, which was a valuable lesson in teamwork and communication. Additionally, I had the incredible opportunity to lead a week-long summer children's creativity camp. Witnessing the growth and creativity of young minds was both fulfilling and enlightening. At the end of the camp, we put on a show for the parents, which was a heartwarming experience for everyone involved. Throughout my internship, I had the privilege of meeting wonderful performers and artists with rich histories in the performing arts. Their stories and journeys served as a wellspring of inspiration, motivating me to continue my pursuit of theater and aspire to do more in the future. This summer internship at WCPA has not only deepened my passion for theater but has also broadened my horizons, leaving an indelible mark on my artistic journey.

## **P18 Public Defenders Office, El Paso, TX**

**Student Intern:** Kiko Dominguez '25

**Major:** Political Science

Unlike private defense attorneys, public defenders consistently have a high volume of clients and cases to work on, so interns were given a wide variety of assignments to help lighten the workload. We would help with researching case law, looking through evidence, meeting with clients, filling out juror spreadsheets, visiting with investigators, observing trials, and giving observations as "fresh eyes" for cases. Working with the El Paso Public Defenders this summer has helped me see firsthand what the criminal justice system looks like for indigent defendants, and how the justice system can fail them. Being able to meet with so many criminal defense attorneys in the office showed me perspectives that I would have never thought about and has influenced me towards this line of work.

[www.epcounty.com/pdefender/](http://www.epcounty.com/pdefender/)



## **P19 McNeil Learning & Development, Piedmont, CA**

**Student Intern:** Braydon Ellis '26

**Major:** Undeclared

McNeil Learning & Development is a small professional education firm based out of Oakland, California. The company puts decades of business and administrative experience to use in training other companies and professionals with courses ranging from Communication in the Workplace, to Diversity Equity and Inclusion. I spent my summer working as a Strategic Marketing and Development intern. My main task over the experience was to rethink the companies marketing and development strategies, taking a 30 year old company structure and adapting it to be successful in modern day. Some of my most memorable accomplishments were designing, building, and publishing a new website for the company, as well as writing a new growth strategy for the company based on market research in the industry. Overall it was extremely rewarding to pursue this unpaid role at a small firm, where I could have significant responsibility and do legitimately impactful work for my employer.

## **P20 NDUR, Boston, MA**

**Student Intern:** Charles Faldi '26

**Major:** Economics

This summer I helped out with a start-up working to create an app for student-athletes to communicate anonymously with each other and provide tips for healthy well-being. As a student-athlete, a significant part of what I did was create or find content to be shown on the app as well as help out with ideas and suggestions for the app. I also got to be a part of two meetings with investors which was great and allowed me to gain real-life experience when dealing with fundraising and trying to find investors. During these meetings, I would speak out about how the app has and would influence my life. I think that it is important for them to understand and talk to their target audience. Another positive is that I got to work with other college students my age who were also passionate about mental health. Overall, it was a life-changing experience.

## **P21 Safe Space: New Mexico Fire Relief, Albuquerque, NM**

**Student Intern:** Christiana García-Soberanez, Dec. '23

**Major:** Sociology

This summer I worked as a Communications Intern in my hometown of Albuquerque, New Mexico. New Mexico Fire Relief works to provide emergency aid during fire emergencies and support long term recovery efforts for New Mexicans who have been affected by wildfires. During my time I helped New Mexicans access much needed resources and worked on the organization's social media. During my time there New Mexico Fire Relief collaborated with the University of New Mexico to place air quality monitors in areas previously affected by wildfire to better study health outcomes in relation to wildfires. Air quality monitors were placed throughout Mora County in New Mexico, which was one of the places most affected by wildfires in 2022. In relation to social media I updated social media, website, and created social media content. [www.nmfirerelief.org/](http://www.nmfirerelief.org/)

## **P22 Generation Teach, Denver, CO**

**Student Intern:** Ethan Gould '24

**Major:** Music

Generation Teach is a nationwide, 7-week summer program under the federally funded AmeriCorps program, and is free to those who attend. Through a lens of social justice and educational equity, Generation Teach seeks to provide elementary and middle school students liberating educational experiences. The site I worked at was Grant Beacon Middle School, located in Denver, Colorado. As a teaching fellow at Generation Teach, my internship consisted primarily of guiding middle schoolers through reading and art lessons. The middle school reading curriculum this year was centered around the novel, "Piecing Me Together" by Renee Watson and focuses on identity development and self expression through journaling activities, group reading, discussions, and activities. My co-teacher and I had the freedom of designing our own curriculum and lesson plans for art class, most of which were hands-on activities that connected with the course material covered in the students' classes. Besides teaching 3 academic classes per day, I was also responsible for greeting students, joining them during recess and lunch, and attending two field trips with them!

## **P23 Ypsilon Sport Clinic, Valencia, Spain**

**Student Intern:** Taylor Harris '24

**Major:** Neuroscience

This summer I was a student assistant at Ypsilon Sport Clinic in Valencia, Spain. I performed ultrasound-guided injections of lidocaine, cortisone, collagen, or ozone therapy into patients with overview from the doctor. Additionally, I performed shockwave treatment on patients with plantar fasciitis, achilles tendon calcifications, and shoulder issues. Throughout my two months abroad, I lived with a host family and worked with hundreds of patients. This opportunity to immerse myself with Spanish speakers greatly expanded my vocabulary and fueled my confidence to engage in medical and daily conversations. Additionally, I shadowed orthopedic surgery at the local hospital. This opportunity heightened my desire to become an orthopedic surgeon myself. I learned how to scrub in, and watched many procedures, such as knee replacements, ACL repairs, and open reduction and internal fixations. To my surprise, the doctors let me assist in several of the procedures, doing various tasks like holding the retractors and spraying the antiseptic solution. Between this and the injections, I quickly learned that liability isn't as prevalent in Spain as it is in the U.S.

## **P24 TESSA, Colorado Springs, CO**

**Student Intern:** Riley Hester '24

**Major:** Psychology

TESSA is a non-profit organization that offers confidential support and services for victims of Inter-Personal Violence, Sexual Assault, Stalking or Human Trafficking. The clinical department at TESSA is made up of staff therapists who provide therapeutic techniques to adult DVSA victims. These clinical services encourage participants to work on self-esteem and provide education about healthy vs. unhealthy relationships. My role as an undergraduate clinical intern included getting TESSA clients into the appropriate therapy services and liaising between the departments at TESSA. Additionally, I saw my own EIP (Early Intervention Prevention) clients which consisted of giving preliminary, additional care and guidance to clinical clients in the form of housing, food, and occupational resources. In the process of working at TESSA, I received Confidential Victim Advocacy training as well as additional training in clinical and legal work. Working at TESSA was a rewarding, interactive, and insightful experience which has prepared me for a future career in clinical work.

## **P25 TESSA, Colorado Springs, CO**

Student Intern: Cerella Zhao '24  
Major: Psychology

This summer, I had the pleasure of interning at TESSA. TESSA is a local non-profit dedicated to supporting survivors of Domestic Violence and Sexual Assault. As a clinical intern, I provided critical support to survivors by offering early Intervention Prevention, and emotional assistance. My role also involved assisting with support groups, helping survivors access resources, and collaborating with the experienced team of professionals to develop personalized care plans for clients. My time at TESSA was spent working directly with survivors in a compassionate and empowering environment, where I witnessed the resilience of those affected by these traumatic experiences. This internship not only deepened my clinical skills but also heightened my understanding of the importance of advocacy and support services in healing and recovery.

# INTERNSHIP PRESENTATIONS, SUMMARIES P26-P50

## **P26 Colorado Springs Department of Parks, Recreation, and Cultural Services, Colorado Springs, CO**

Colorado College's Public Interest Fellowship Program

**Student Intern:** Emma Logan '24

**Major:** Political Science/History

Independently led over 36 hours of observation at local lake to track community impact of developing irrigation system and inform regulations of lake usage at city park. Also analyzed data from over five years of city permits to prompt discussion of possible discounts for participating nonprofits. [www.coloradosprings.gov/parks](http://www.coloradosprings.gov/parks)

## **P27 Parent Possible, Denver, CO**

**Student Intern:** Mariolivia Jimenez '24

**Major:** Sociology and Hispanic Studies

During the summer, I was given the flexibility and opportunity to work in different programs such as Communications, Economic Mobility, DE&I Committee, and Vroom. This fellowship opportunity allowed me to dive into qualitative research to support the communication efforts of Parent Possible. One of my highlights with this research was ending the summer with a successful presentation on the findings and insights I came across. Within Economic Mobility and DE&I, I collaborated and brainstormed with supervisors and mentors on how to further promote accessibility towards helpful resources to both employees and families. I had the amazing opportunity to attend *La Cúspide*, a Latino family conference to represent Vroom which is a free bilingual app to help child development as well as foster meaningful relationships in families. Overall, the major highlight of this summer was supporting all these programs' efforts and being given the opportunity to continue to focus on community-based work at Parent Possible. <https://parentpossible.org/>

## **P28 Greenwood Wildlife Rehabilitation Center, Longmont, CO**

**Student Intern:** Portia Holt '24

**Major:** Environmental Studies

I spent my summer interning as a wildlife rehabilitator. Its mission is to provide care to orphaned, injured, or sick wildlife, then release them back into the wild; my internship focused on exactly this. I was trained to take care of raccoons, wild birds (Robins, Finches, Hummingbirds, etc.), and waterfowl. My main responsibility was to treat, feed, and monitor the health of the different species. For raccoons, I bottle fed the babies until they could eat solid food, and for wild birds, I syringe fed them until they could eat solid food and then eventually eat on their own. Once the animals were old enough and strong enough, they were moved to outside cages to symbolize the wild. After they spend time outside, we release them back to where they were found. During my summer at Greenwood, I treated hundreds of animals and got to be a part of each step of the rehabilitation process at the only center treating wild birds, waterfowl, and mammals along the Front Range from Pueblo to the Wyoming border. [www.greenwoodwildlife.org/get-involved/internships/](http://www.greenwoodwildlife.org/get-involved/internships/)

## **P29 PriceAdvantage, Skyline Products, Colorado Springs, CO**

**Student Intern:** George Jogi '25

**Major:** Mathematical Economics and Asian Studies

During my summer internship as a Data Analyst Intern, I engaged in diverse tasks that enriched my analytical skills and provided valuable insights into the retail industry. My primary responsibilities included categorizing United States convenience stores by store and brand, emphasizing accuracy and data refinement. This meticulous data management improved overall data quality, ensuring more informed decision-making. I also conducted research to identify store brands meeting specific store count criteria and integrated them into the master list, adhering to brand marketing standards. This task deepened my understanding of brand management and compliance. Working with visit count dashboards was another crucial aspect of my role. Analyzing foot traffic trends across brands and markets over time helped identify meaningful insights, sharpening my data interpretation and visualization abilities. One standout project involved running correlation analyses between gallons sold and foot traffic trends. This analysis revealed significant relationships, potentially influencing pricing and marketing strategies. In summary, my internship at Price Advantage provided hands-on experience in data analysis and its real-world applications. It enhanced my appreciation for accurate data in decision-making and provided insights into the retail sector. This experience has been invaluable, shaping my professional growth and equipping me with practical skills for future endeavors.

## **P30 Kino Oko and Marvie Productions, Skopje, North Macedonia**

**Student Intern:** Oli Kamenarovska '26

**Major:** Film and Media Studies

This summer, I had the chance to embark on a transformative internship journey in the Macedonian film industry. My time was spent working with two exceptional video production companies where I gained invaluable hands-on experience as a filmmaker. While interning at Kino Oko, I immersed myself in the logistical complexities of media production. From observing shoots' coordination to discussing and observing casting calls, I learned everything you need in order to turn creative ideas into visual masterpieces. What set my summer apart was my involvement with Marvie Productions, a vibrant youth production company. Here, I applied my Kino Oko insights to smaller projects, enjoying creative freedom while refining my skills based on feedback received from my colleagues and supervisor at Kino Oko. If you're a fellow filmmaker interested in the ins and outs of the Eastern European Film Industry, feel free to reach out— I'd love to share my experiences and inspire others to explore this dynamic field further.

<https://kinooko.com.mk/>

## **P32 Mariposa Center for Safety, Pueblo, CO**

**Student Intern:** Lia Kelly '24

**Major:** Sociology

Mariposa Center for Safety is a domestic violence shelter in Pueblo, CO. Their goal is to empower survivors of domestic violence, human trafficking, sexual assault, and family abuse through increasing self-sufficiency and self-worth, education, prevention, victim advocacy, and by offering emergency services, provisions, and shelter when needed. They have an admin building, domestic violence shelter, visitation center, and child care center. I primarily worked at the admin building and spent most of my time doing intakes. Clients come in and do a 90-minute intake where we ask them questions about their situation and see if they qualify for our services. On Fridays I worked as a case manager intern at the International Rescue Committee (IRC) in Denver, Colorado. Their goal is to help people affected by humanitarian crises—including the climate crisis—to survive, recover and rebuild their lives. They are an international company that has offices all over the world.

### **P33 University of Maryland, Baltimore School of Medicine, Baltimore, MD**

**Student Intern:** Brett Kitazono '24

**Major:** Neuroscience

This summer I was given the chance work at the University of Maryland, Baltimore, in the Opthamology research department under Dr. Steven Bernstein. During the first half of the month of June, I shadowed the Scientists working in the lab. I got the chance to see them perform a variety of techniques (Optical coherence tomography, freezing microtome slicing, immunohistochemistry, polymerase chain reactions, rat handling), as well as a basic experience of what a typical day might look like. After a couple of weeks, I had the chance to do my first immunohistochemistry slide on a 3 year old ferret retina. I was simultaneously learning additional laboratory techniques and doing computer based measurements of various treatments related to exosome treatments for Nonarteritic Ischemic Optic Neuropathy.

### **P34 Schnader Harrison Segal & Lewis, Philadelphia, PA**

**Student Intern:** Alyssa Kopczynski '25

**Major:** Mathematics

This summer I had the opportunity to work at a Philadelphia based law firm as a marketing intern. I had several responsibilities. I helped lawyers update their bios and notable achievements and then I helped promote those achievements through LinkedIn and legal sources online. I drafted appropriate social media posts around important holidays and legal landmark events. I tracked media patterns and traffic of the firms' clients and looked at how state and federal case law would impact the firms' clients. I investigated media mentions of the firm to help promote their work. I gained insight into both the business of how a law firm operates, and how lawyers need to both keep their skills and knowledge up-to-date and promote their expertise to current and future clients. I was most interested in how the firm stayed on top of state and federal court decisions and made sure that lawyers reached out to their current clients to make them aware of how those findings and changes in the law would affect their clients' business and possible on-going legal work. [www.schnader.com/](http://www.schnader.com/)

### **P35 Whale Shark and Oceanic Research Center, Utila, Honduras**

**Student Intern:** Megan Krussman '25

**Major:** Organismal Biology & Ecology

My interest in Organismal Biology and Ecology extends outside of Colorado's terrestrial ecosystems and into marine science. The changing climate drives me to learn research and conservation techniques to preserve the ocean's ecosystems. This curiosity led me to the Whale Shark and Oceanic Research Center in Utila, Honduras. This NGO started as a research center specifically dedicated to collecting data on the whale shark population near Utila and has grown to incorporate research, conservation, and education related to many marine organisms. As a conservation intern, I learned the names and ecological roles of most of the organisms within the Caribbean reef ecosystem, surveyed fish populations, treated corals for Stoney Coral Tissue Loss Disease, removed invasive lionfish, and collected data on marine megafauna, such as dolphins, when sightings occur. Over the month these were just a few research and conservation techniques I practiced. In addition, I practiced looking at a conservation goal from multiple stakeholders' perspectives, participated in community engagement, and assisted with local beach cleanups. During my second month on Utila, I participated in Divemaster Training, the first professional training level in scuba diving. During this training, I practiced rescue techniques, underwater scuba skills, leading divers, and assisting in scuba training courses. This certification allows me to guide others in the underwater world where they can be inspired to advocate for the protection of these ecosystems. The combination of understanding the coral reef ecosystems, research techniques, conservation efforts, and excelling in my scuba skills has set me up to continue my path toward a career in marine research and allows me to motivate others to get involved as well.

## **P36 Inside Out Youth Services, Colorado Springs, CO**

**Student Intern:** Misbah S. Lakhani '24

**Major:** Feminist and Gender Studies

This summer, I was the Creating Protective Environments Intern with Inside Out Youth Services. While working with the Outside Inside Out Team, I got the opportunity to attend a lot of events during the summer. During June and the rest of summer, I attended Inside Out's Youth Pride, Colorado Springs' Pikes Peak Pride, and Pueblo Pride! I even got to walk in Pikes Peak's Pride and be a part of the actual parade. Not only that, I got to help launch a new resource available for young adults in Colorado Springs called COS Qmmunity Events. It is now a fully functioning project that helps young adults in the Pikes Peak area know of events and safe spaces for queer people. It was really fun to work on this project especially because they took my personal feedback of what is needed for queer young adults in the Springs and implemented it into the project.

## **P37 Duke Law First Amendment Clinic, Durham, NC**

**Student Intern:** Mia Leggatt '24

**Major:** Political Science

The Duke University Law School First Amendment Clinic works to protect and advance the freedoms of speech, press, assembly, and petition. The clinic advises and represents individuals and groups with First Amendment concerns or claims who could not otherwise afford the assistance of lawyers with this specialization. Additionally, they provide legal analysis on pending or enacted legislation that violates First Amendment rights. In 2019, the clinic started a public database regarding free speech violations on higher education campuses in the United States. It documents these instances and how they were resolved, both involving litigation and out of court circumstances. This database is aimed to provide assistance to administrators and practitioners litigating or dealing with campus speech claims. I am so grateful to have been given the opportunity to work with such an incredible group of individuals doing such important work. This internship not only gave me immense exposure to the constitutional legal system, but also advanced my writing, researching, and communication skills. I have been given the opportunity to continue working with the clinic throughout the academic year, and I cannot wait to take these skills and lessons I have, and will continue to, learn with me in both my academic and professional career.

<https://law.duke.edu/firstamendment/>

## **P38 University of California Los Angeles (UCLA), Los Angeles, CA**

**Student Intern:** Jingyi Liu '24

**Major:** Mathematics

Lyme disease is the most common vector-borne disease in the United States, with approximately 476,000 Americans who are diagnosed and treated for Lyme disease a year. Given the difficulties patients have experienced in recovering from Lyme disease, we aim to use patient-generated data provided by our community partner Lymeisease.org to discover underlying patterns. We explored a variety of machine learning techniques, including Non-negative Matrix Factorization (NMF). Compared with Principal Component Analysis (PCA) and Vector Quantization (VQ), NMF is a part-based learning algorithm and requires nonnegativity constraints. It helps to reduce the dimensionality of our data set and reveals significant information about patients' features concerning their particular situations. One of our main focuses is extracting symptom patterns in Lyme patients with unsupervised NMF to illustrate what leads to the different statuses among well and unwell patients. Moreover, we implement Semi-supervised NMF (SSNMF) as a classification tool to study which features contribute to neurological manifestations for chronically unwell patients.

## **P39 Food to Power, Colorado Springs, CO**

**Student Intern:** Ayden Cherry '24

**Major:** Environmental Studies

Our mission at Food to Power was to seek to aid those impacted by the food desert that exists in Colorado Springs. Part of what I had to do while at Food to Power was work on the farm. Everything they grew on the farm would either be given out at our no-cost grocery program or sold for a price less than market value. On the farm, I would help harvest and clean vegetables, plant new crops and do maintenance work like weeding and trellising. While this was often in the heat of the day, it was one of the most exciting things I got to do at Food to Power. When I wasn't on the farm, some days I helped out in their no-cost grocery program. For this program, I helped in the food rescue process through local supermarkets, and we would welcome participants to pick out groceries for the week. This was a rewarding part of the experience where I felt as if I was able to connect with the greater Colorado Springs community. I also helped with Street Petz, making lunches to distribute to people experiencing homelessness at a local park; the no-cost delivery, helping with food recovery and with making grocery bags for elderly participants who may have a harder time getting to a supermarket; and the compost program, biking around the Springs to collect compost from our partners and flipping compost piles.

## **P40 Food to Power, Colorado Springs, CO**

**Student Intern:** Lucie King '24

**Major:** Organismal Biology and Ecology

Food to Power is a local non-profit organization dedicated to cultivating a healthy, equitable food system in the greater Colorado Springs community. Located in the Hillside neighborhood of Colorado Springs, Food to Power was founded in 2013 by two Colorado College graduates. Through its three pillars of action; Food Access, Food Education, and Food Production, Food to Power promotes collaboration, equity, resilience, and innovation. Over the summer, I worked closely with all the departments throughout the week. Twice a week, I helped the Food Access department with the No-Cost Grocery Program which entailed sorting donations of produce, meat, dairy, baked goods, and prepared meals from local grocery stores and farms, setting up the space for the program, and helping run the program. Every other Saturday during the No-Cost Grocery program, I cooked a recipe with the Food Education department using fresh produce from the Food to Power Farm to share with program participants. We provided copies of our recipe and prepared bags of the produce we used so that people could try it for themselves at home! The rest of my time at Food to Power was spent with the Food Production department running compost collection routes in nearby neighborhoods, monitoring and flipping compost piles, taking care of seedlings, and pruning, trellising, harvesting and transplanting vegetables on the farm. <https://foodtopowerco.org/>

## **P41 Food to Power, Colorado Springs, CO**

**Student Intern:** Sydney Vine '24

**Major:** Integrative Design Architecture

This summer I had the privilege to work with Food to Power, a non-profit organization located in Colorado Springs, CO that seeks to transform and strengthen the food system into co-powerment and equity. The three main pillars of action involve Food Access, Food Education, and Food Production. I was involved in each of these domains throughout the entirety of my summer internship experience. The week began working with Food Production and Food Education, as I was tasked with the responsibility of flipping and hydrating the compost and fungi piles, collecting compost from the surrounding neighborhoods, and engaging in teach backs led by alternating staff members in various departments. Further into the week, I was immersed in Food Production through on-farm tasks, like weeding, harvesting, mending the soil, trellising, transplanting, and pruning. Toward the end of the week, I collaborated with the Food Access team through the No-Cost Grocery and No-Cost delivery programs, for which I sorted and organized produce, meat, dairy, and baked goods that were donated from surrounding markets and services, like Whole Foods, Mountain Mama Natural Grocers, Farm to Fork, Sprouts, and Natural Grocers. At the end of the week we hosted an on-site farm stand to sell fresh produce harvested from our garden. <https://foodtopowerco.org>



## **P42 Larimer County Department of Human Services, Fort Collins, CO**

**Student Intern:** Amalia Lopez '24

**Major:** Psychology

The Larimer County Department of Human Services Youth and Family Division aids families in need through providing transportation, counseling, financial, and other various forms of support. Caseworkers work directly with families to create treatment plans that allow parents to regain custody in situations where custody may have been lost. The process of losing and regaining custody is straining and requires allocation of time, energy, and resources. For families without a vehicle and with minimal financial resources, the difficulty of traveling between court, visitations, and other commitments, such as doctor appointments, can be minimized with resources allocated by the Department of Human Services. As an intern, I helped transport youth to their various commitments and in doing so assisted case workers with their intense workloads. As families face their struggles, case workers feel the strain of their needs and must manage the complexities of multiple cases on a consistent basis. Through my summer experience with the department, I gained extensive knowledge and experience through shadowing home visits, assisting with transportation, writing ROC notes and other documentation. Overall, my position as an intern was aimed to foster my growth as a student and aid case workers on their various tasks.

## **P44 Northern Arizona University, Flagstaff, AZ**

**Student Intern:** Remi Maher '25

**Major:** Psychology

As a Strength and Conditioning Intern, I learned the fundamentals of coaching, the “why” behind specifically designed training programs for which I designed as well, and the politics between sports staffing positions. In my intern role I worked with multiple sports including Men’s Football, Women’s Basketball and Women’s Volleyball, all of which are Division 1. Furthermore, I was responsible for specific sports testing with the athletes such as using Force Decks to assess an athlete's individual strength, stability and movement. Over the course of my internship, I developed relationships with the athlete’s which were crucial in order to coach them. Learning how to coach an individual, especially high level athletes, takes time and the development of mutual respect. By being in this specific work environment I was able to see how strength coaches, sports coaches, and the athletic staff interact to better the performance and health of their athletes.

## **P45 USDA’s Farm Service Agency, Lakewood, CO**

**Student Intern:** Peyton Marshak '24

**Major:** International Political Economy

Over this past summer I had the opportunity to intern with the USDA’s Farm Service Agency in their state administrations office in Lakewood, Colorado. My main task was re-designing and implementing a new state-wide online resource library and archive for use in all 64 Colorado county offices. I also attended a multi-day state-wide Farm Loan training, and learned more about how the FSA distributes billions of dollars annually to beginning and disadvantaged agricultural producers across the country. In addition to Farm Loans, I received training on the 10+ programs that FSA administers ranging from Volcanic Disaster Crop Insurance to Dairy Subsidies along with how GIS products are used to catalog millions of farms across the United States. I was able to sit-in on a State Committee meeting and witness the unique process of elected leadership and decision-making within an executive branch agency.

## **P46 A. James Clark School of Engineering, University of Maryland, College Park, MD; and Dr. Kelsea Best of Ohio State University, Columbus, OH**

**Student Intern:** Mia Matteucci '24  
**Major:** Environmental Studies

My summer REU project advanced PI-Reilly's CAREER Grant "Strengthening U.S. Infrastructure and Communities through Science-Informed Disaster Policy and Engineering Civic Engagement" by unpacking how U.S. disaster policies moderate negative long-term community impacts from disasters as measured by housing disruptions. I, with the guidance of multiple mentors, led the investigation of how federal disaster aid in the form of FEMA's Public Assistance program and HUD's Community Development Block Grant Disaster Recovery (CDBG-DR) funds influence post-disaster housing stability and affordability, especially as they relate to vulnerable populations, across the U.S. I specifically looked at Miami and New York City, comparing the ways that post-disaster funding could potentially perpetuate climate gentrification. I formed a strong understanding of climate gentrification in these two cities by conducting many on-the-ground interviews with professors, nonprofit agents, government officials, and residents. I also utilized R Studio to calculate the allocation of CDBG-DR, which I then brought into ArcGIS Pro to conduct a geospatial analysis of the funding. <https://cee.umd.edu/>

## **P47 Atlanta Police Department, Roswell, GA**

**Student Intern:** Matthew Miramontes '24  
**Major:** History

The Atlanta Police Department Internship I participated in was very educational and taught me a lot about the law, workplace, mission of the police, and more. I would state that this experience is a great pre-law thing to do. If you are looking at any legal related career, seeing things through the view of law enforcement is a great way to learn about the law and see how it applies to individuals. In this experience I got to take part in active police investigations and aid officers in a variety of different ways. The best thing about the internship for me was getting to go to crime scenes and learn about what the police approach was to solving and helping the people at the scene. The police are a very community-based organization and the experience offers a great perspective if you are thinking of any legal related career.

## **P48 University of Rochester, Rochester, NY**

**Student Intern:** Max Morrow '24  
**Major:** Mathematical Economics

I had a fantastic summer working at the University of Rochester as an intern for the health and economics lab. The internship helped me gain skills and experience that I will utilize moving forward in my academic and professional career. I worked for Dr. Hill and collaborated with other undergraduates and pre-doctorate students in person and remotely. I spent most of my time helping with different projects and papers focusing on topics like water quality and opioid-use disorders. I conducted extraction and management of data on redlining and lead levels in school drinking water for future papers and studies. I also conducted literature reviews: one of them on chemotherapy drug shortages and patient outcomes. Another data extraction project I was working on was about OUD and how other research papers use diagnosis codes. I learned how to use a variety of different software/tools like, Overleaf, Covidence, and Zotero. I also had the opportunity to attend coding workshops hosted by CIRC at the University and access to data camp through the internship. [www.urmc.rochester.edu/public-health-sciences.aspx](http://www.urmc.rochester.edu/public-health-sciences.aspx)

## **P49 SEKO Logistics, Chicago, IL**

**Student Intern:** Erin Mullins '24

**Major:** Organismal Biology and Ecology

As an intern for SEKO Sustainability, I was responsible for collecting climate and emission-related data for SEKO's corporate-owned warehouses. SEKO has embarked on its ESG (Environmental, Social, and Governance) journey; the first step of our environmental goals is to understand what our footprint is and its sources. For office buildings, we started from scratch to establish the framework of what operations are included in our Greenhouse Gas Inventory. Our data collection methods and philosophies will be used as baseline emissions in which every year's comparison. In addition to our emissions calculations, I also created an ESG directory: a one-stop-shop document with all of our ESG goals, what we have completed, what needs to be completed, and their priority level. This streamlines information between departments and allows for visualization of the bigger picture. I also worked collaboratively with the sustainability department for an aggressive emissions reduction certification, Science-Based Target Initiatives. [www.sekologistics.com/us/about/seko-cares-esg/](http://www.sekologistics.com/us/about/seko-cares-esg/)

# INTERNSHIP PRESENTATIONS, SUMMARIES P51-P75

## **P51 Atlas Preparatory School, Colorado Springs, CO**

**Student Intern:** Anna Mackey '24

**Major:** Sociology

My role as the HR assistant at Atlas Preparatory School introduced me to various aspects of HR, ranging from talent acquisition and onboarding to employee relations and auditing processes. I took on multiple projects this summer that involved tracking missing employee files as the Atlas HR team transitioned to a new payroll system. I assisted with new employee onboarding tasks in collaboration with the HR Specialist and fielded incoming employee inquiries. In addition, I also was invited to sit in on many in-person interviews, sample teaches, and work with the Talent Acquisition Specialist to better understand the hiring process. In the last month, I have been working to organize the *New Staff Institution* (NSI) and *All Staff Institution* (ASI) that facilitate teachers' transition from summer into the upcoming school year. I organized close to 200 name tags and swag bags, as well as created decorations for both events. Additionally, I worked on a handbook video with animations and voice-overs explaining the updated handbook. The hands-on experience I gained has been invaluable, and I am confident that the skills I developed here will serve me well in my future endeavors.

## **P52 The Place, Colorado Springs, CO**

**Student Intern:** Isabella Nevin '25

**Major:** Political Science

This summer, I worked as a Development Intern at The Place, a homeless shelter which serves youth in the Colorado Springs area. I worked within the Development team, which focuses primarily on fundraising for the organization. We worked to organize and execute The Place's largest annual fundraiser, the Off the Street Breakfast, which gathered 800 people from the Colorado Springs area under the Colorado Avenue bridge to raise over \$150,000 dollars for The Place. I was also on the accounting team following the fundraiser keeping track of Off the Street Funds, and was able to engage with donors through thank-you calls following the breakfast. I also was able to interview youth at the shelter about how they interact with The Place compared to other institutions, their day to day lives and hopes. Using qualitative interviews, I was able to create a database of youth statements for future reference for my team, as well as interact more directly with the people assisted by The Place. I also contributed written content to both the organization's website, as well as their newsletter.

## **P53 DZANC Books, Ann Arbor, MI**

**Student Intern:** Julia Nichols '24

**Major:** English - Creative Writing

This summer I worked for Dzanc Books Press, an independent press that specializes in speculative fiction and nonfiction (with some poetry added to the mix). Through this editorial internship, I learned about writing and publishing from the point of view of the press. Each week, I was assigned 1-3 manuscripts to read and evaluate through five perspectives: summary, potential audience, comparative titles, publishing potential, and personal opinion. Along with this, the press held a weekly meeting where the editor-in-chief gave a lecture on the different aspects of publishing. These lectures covered the path of publishing from acquisition, final edits, and pursuing an editing or writing career. One of my personal highlights was reading unpublished manuscripts because it was exciting to read potential upcoming fiction before anyone else and have a say in whether a press should invest in the title. As a writer, I appreciated learning about the potential career paths, different kinds of editing, the thought that goes into planning a year of publishing, and what presses look for when acquiring titles. In the future, I would like to further pursue my interest in editing and publishing.

## **P54 DZANC Books, Ann Arbor, MI**

**Student Intern:** Katie Rowley '24

**Major:** Creative Writing

DZANC Books is an independent book publisher that focuses on publishing literary fiction, as well as some nonfiction and poetry books. Through my work as an intern at DZANC this summer I was able to learn from Editor-in-Chief and Colorado College alumni, Michelle Dotter, about various aspects of the publishing world. Through weekly virtual meetings with about half of the DZANC interns, myself included, Dotter gave lectures on topics spanning from the different types of editing to the timeline for publishing a book and how publishers plan that timeline. This opportunity also allowed me a lot of hands-on experience through reading and evaluating submitted manuscripts, working with a team of other interns to research various local bookstores, and copyediting manuscripts. [www.dzancbooks.org/](http://www.dzancbooks.org/)

## **P55 DZANC Books, Ann Arbor, MI**

**Student Intern:** Zoe Smith '25

**Major:** English - Creative Writing

DZANC Books is an almost entirely remote publishing agency based in Ann Arbor, MI. The Editor in Chief, Michelle Dotter, is a Colorado College Alum who was a creative writing major who had Steve Hayward as an advisor during her time here, the same advisor I have currently, which is how I heard about the internship. The goal of this company is to find haunting pieces of literary fiction that deserve a chance to have the work seen. They look for stories major publishing companies most likely wouldn't find interest in, which makes a unique and exciting first internship in the field. My job for the summer is to work as a remote copy editor. My employer assigns one to three manuscripts a week where I have to read and assess if they have what it takes to be considered for publishing. I look for everything from grammatical errors to larger thematic issues that can be found throughout the whole plot. The goal of this internship was to introduce a new wave of students to the business side of writing and the skills it has to offer. I am grateful to have learned about many aspects from marketing, sales and the actual process of editing a novel.

## **P56 Student Conservation Association and AmeriCorps, Mount Tabor, VT**

**Student Intern:** Wade Noelke '24

**Major:** English Literature

Over the summer, I worked as an SCA and AmeriCorps intern at Green Mountain National Forest, Vermont. I had an awesome time working with fellow interns and U.S. Forest Service personnel to responsibly manage eight congressionally-designated wilderness areas in Green Mountain. My main tasks included trail building and maintenance, trail water-bar creation and maintenance, solitude monitoring in wilderness areas to gauge the level of opportunity for solitude for guests, public outreach, and campsite cleanups. The best part of my job was being able to hike and work outside almost every workday, and then swimming and biking/exploring/camping on weekends. I would highly recommend this internship experience with the SCA and AmeriCorps for anyone interested in outdoor public service, especially in an official role on federal lands. The friends, outdoor time, and meaningful work resulted in a great summer experience that I will never forget!

## **P57 Campaign to Elect Kasandra Gandara for Mayor, Las Cruces, NM**

**Student Intern:** Adelaide Olberding '26

**Major:** Political Science

Located in southern New Mexico, Las Cruces is the second largest city in the state, just over 40 miles from the US-Mexico border and has a minority-majority population with over 60% of residents identified as Hispanic. Kasandra Gandara has served on the city council for the past eight years and as Mayor Pro Tempore for the last two. Additionally, the city council in Las Cruces is made up entirely of women, something very unique. She would be the first female mayor of the city, and the first Latina mayor as well. As a part of a small campaign staff in my hometown, I was able to experience every role within the staff. Working on finances, planning events, social media, and more. I fully learned what a race looks like for an authentic candidate who is representative of the community she serves.

## **P58 United Nations Relief and Works Agency for Palestine Refugees (UNRWA), Amman, Jordan**

**Student Intern:** Manar Othman '24

**Major:** Political Science

United Nations Relief and Works Agency for Palestine Refugees is a UN agency that works with Palestine refugees, displaced in and after 1948 due to Israeli colonialism and illegal settlements. It provides public-like services: education, health care, protection, and relief and emergency services. Unlike other UN organizations, UNRWA is totally funded through voluntary contributions. Since its establishment, it has suffered from chronic underfunding. I was interning at the External Relations department- Public Donorships and with the MENA division. My team was responsible for public fundraising from Arab donors. Despite UNRWA claiming to be an apolitical organization, every aspect of its work is indeed very political. It was interesting for me to see the dynamics and trends of donations in the Arab world to the Palestine cause. My work during the internship was primarily focused on helping them evaluate and study opening new representative offices in Qatar and United Arab Emirates to enhance their fundraising activities there.

## **P59 El Pomar, Colorado Springs, CO**

**Student Intern:** Mahnoor Rehman '24

**Major:** Political Science

El Pomar works for philanthropy to help different organizations within the state of Colorado. The core of my internship was related to investments, programming, and communications. I got the chance to work with a motivated team throughout the summer where I learned a lot about philanthropy, grantmaking, non-profit management, and investments. I worked at the foundation for almost 2 months and also went through professional development training with 4 different supervisors. I also got the chance to do data analytics and write a press release for the foundation.

## **P60 Colorado Jewish Climate Action, Denver, CO**

**Summer Intern:** Roxy Reisch '24

**Major:** Environmental Studies

Colorado Jewish Climate Action (CJCA) is a Denver based nonprofit dedicated to inspiring the Jewish community to engage in climate action. CJCA's mission is inspired from the Jewish teaching, "if not us, who?" Throughout the summer I developed a greater understanding of environmental nonprofit work. I worked on a wide range of projects and committees. I researched, wrote, and designed a guide to help Denver-based Jewish institutions comply with the Energize Denver Ordinance which requires all buildings over 25,000 square feet to reduce their emissions by 30% by 2030. I developed a curriculum for a 9-month educational program which seeks to provide participants with the necessary skills to advance climate activism in their communities. I also created a list of environmental b'nai mitzvah projects that encourage mitzvah students to focus their service work on the environment. Throughout the summer I was able to explore a variety of environmental career fields and develop a network of partners in Colorado. [www.coloradojewishclimateaction.org](http://www.coloradojewishclimateaction.org)

## **P61 Jewish Family Service of Colorado and Disability Law Colorado, Denver, CO**

**Student Intern:** Tess Rittenberg '25

**Major:** Sociology

As the Community Resources for Stability (CRS) Intern at Jewish Family Service of Colorado, I published over 200 organizations in a resource tracker, worked with the Weinberg Food Pantry, and participated in team meetings for the Rapid ReHousing and Emergency Housing Assistance Program Teams. I also assisted their Disability Services program with creating a disability etiquette training and completed administrative work for their Best Buddies program. At Disability Law Colorado, I compiled a report detailing the processes for Department of Corrections Ombudsperson Programs across the country and created a one-pager that was presented to Representative Judy Amabile. This is in process to become a bill later this spring. I also did work for the communications team promoting research on the Americans with Disabilities Act and the 504 Rehabilitation Act. [www.jewishfamilyservice.org](http://www.jewishfamilyservice.org), [www.disabilitylawco.org](http://www.disabilitylawco.org)

## **P62 Equitable Advisors, Manhattan, NY**

**Student Intern:** Alex Russo '24

**Major:** Business, Economics, Society

This summer I had the privilege of joining Equitable Advisor's Wealth Management team in Midtown Manhattan, New York, as a summer intern Financial Analyst. Throughout this internship I learned about Financial Services and the Securities Industry as a whole. I performed market research for portfolio managers on the team, as well as learning the holistic ideas of financial plannings from the representatives at Equitable, ranging from Investment Management to Insurance Planning. Throughout my internship I was also able to study diligently for the Securities Industries Essentials Exam, gaining my certification. This is one of the initial Financial Exams required on your way to becoming a Licensed Broker. This is my biggest accomplishment of this internship, because I put in a very large amount of time into studying and passing, while also still doing work for the team at Equitable Advisors. This was an amazing experience, where I was able to learn and grow professionally and personally throughout.

## **P64 Climate Smart Missoula (CSM), Missoula, MT**

**Student Intern:** Reeve Schroeder '24

**Major:** Anthropology and Spanish

CSM is a small, environmentally-focused non-profit that serves Missoula County and works with groups throughout all of Montana. My internship focused in the climate resiliency area, taking a deep dive into wildfire smoke and extreme heat preparedness. My work with wildfire smoke, based on a Clean Air - Healthy Homes grant from the EPA, was focused on promoting healthy indoor air quality during wildfire smoke season through community outreach, education, and resource sharing. I also contributed to the organization by conducting independent research on extreme heat, creating a database of resources for Climate Smart and other community partners to use while developing an extreme heat preparedness plan for Missoula County. In addition, the collaborative approach of CSM created a special opportunity for me to tap into the work of several environmentally-focused groups in the area – gaining a strong understanding of what is being done in the community and the role that various sectors and groups play.

## **P65 YoungLife's Beyond Malibu, Egmont, British Columbia, Canada**

**Student Intern:** Henry Sheridan '26

**Major:** Philosophy

I spent the summer guiding groups of high school kids on 8-day sea kayaking and mountaineering trips in British Columbia. YoungLife is a global non-denominational Christian organization, Beyond Malibu is one of their adventure camps. A guide partner and I were in charge of stewarding the physical, emotional, and spiritual needs of kids for the duration of the trip. We took groups up technical mountains, through the worlds largest tidal rapids, and far beyond their comfort. When not on a trip I spent my days in Beyond's basecamp. Here we did all the grunt work necessary for keeping the outfit running. Think cleaning ropes, doing dishes, and the maintaining dreaded grease trap. Time in basecamp formed a tight knit community focused entirely on serving kids from around the US and Canada. Beyond transformed my view of service, leadership, and reformed my idea of what community looks like.



## **P66 Mothers Against Drunk Driving of Colorado and Court Appointed Special Advocates of the Pikes Peak Region, Colorado Springs, CO**

**Student Intern:** Ella Simons '25  
**Major:** Political Science

Mothers Against Drunk Driving (MADD) is a non-profit organization that works to prevent drunk driving and support victims of drunk driving-related incidents. MADD's mission is to eliminate drunk driving, support victims of impaired driving crashes, and prevent underage drinking. MADD provides various services and initiatives, including advocacy for stricter drunk driving laws and policies at the local, state, and federal levels. In my role as a court monitoring intern, I was responsible for observing and documenting court proceedings related to impaired driving cases. This includes attending hearings and trials, taking notes, and collecting data on sentencing outcomes. The information I gather will be used to track trends and identify areas where improvements can be made in the justice system's response to impaired driving. I was also an Intern in Communications and Organization of Special Events at Court Appointed Special Advocates of the Pikes Peak Region (CASA). My job was to assist at The Hanger, a store specifically designed to offer stability to teens in foster care. In addition to volunteering at The Hanger I helped around the office preparing for events. For example, I spent a large chunk of my internship organizing and facilitating the back-to-school event where teens in foster care in El Paso County or Taylor County come into the office to pick out school supplies. I organized, sorted, and took inventory of all school supplies donated to CASA. All donations are greatly appreciated, however, people do not often consider that these kids would like nice things as well. The goal of CASA and my internship was to provide these foster children with normal experiences such as receiving new supplies for school and items of high quality as they so deserve.

## **P67 St. Marks National Wildlife Refuge, St. Marks, FL**

**Student Intern:** Lucy Soulliere '24  
**Major:** Organismal Biology & Ecology

As a biology intern at St. Marks National Wildlife Refuge, I got the opportunity to learn about and participate in the management of gulf coast flora and fauna. Red-cockaded woodpeckers and frosted flatwoods salamanders are threatened and endangered species that call the refuge home. I, along with another biology intern, assisted the wildlife biologist in collecting occupancy data on the woodpeckers and assessing the habitat suitability and management needs of salamander ponds. Additionally, I upkept blazes on over 700 woodpecker cavity trees and participated in surveys for shorebirds, plovers, oystercatchers, and rattlesnakes. Overall, it was a wonderfully rewarding experience where I was granted a great deal of independence in the field and learned to improvise on my feet. Also, I saw bears, bobcats, flying squirrels, and so many other forest critters!

## **P68 The Mentora Foundation, New York, NY**

**Student Intern:** Haley Strom '24  
**Major:** Psychology

The Mentora Foundation is a non-profit consultancy in New York City committed to diffusing the Mentora leadership philosophy beyond the confines of corporate settings. During my internship with the Mentora Foundation, I collaborated with the CEO, Hitendra Wadhwa, and the Director of Strategic Development, Taylor Parker. Central to the Mentora Foundation's ethos is leadership development through storytelling. Over the past four years, Dr. Wadhwa has tasked his students with writing narratives around leadership moments, amassing a collection of 1,000 stories, which I sorted through and edited. Another project I undertook was the Changemaker Project, an embodiment of the Foundation's commitment to nurturing "changemaker qualities." This endeavor encompassed a search through newspapers, podcasts, and over 50 books for individuals dedicated to positive change. Additionally, a technological frontier that I explored was the training of an AI-driven leadership development tool, akin to the capabilities of ChatGPT. Collaborating with their lead engineer, I developed training exercises for the AI. Lastly, I wrote Dr. Wadhwa's newsletters for the upcoming four months. These tasks allowed me to further hone my journalism, communication, and leadership development skills, and to contribute to the Foundation's ongoing engagement with its stakeholders.

## **P69 Gentle Landing Birth Center, Hanover, NH**

**Student Intern:** Peiper Thomas '25

**Major:** Molecular Biology and French Double Major

This summer, I participated in a midwifery internship with Gentle Landing, one of two CABC accredited birth centers in all of New England. Gentle Landing offers midwifery-led prenatal, intrapartum, and postpartum services, work which is integral to improving the United States' abysmal maternal mortality rate. Under the guidance and instruction of CPM Katherine Bramhall, I've gained foundational midwifery competencies and discovered the tenets of heart-led, client-centered care. This internship not only expanded my capacities to collaborate under pressure and listen deeply, but also introduced me to home and facility birth assistance, methods of client empowerment, and basic medical skills, such as vital collection, blood draws, and urinalysis. In addition to my clinical pursuits, I launched an e-catalog for the birth center's library to provide clients with cost-included educational resources for loan and expanded Gentle Landing's provider/client outreach program to raise local awareness for the birth center. I dearly thank Katherine for her imagination and trust as a teacher and mentor. My eternal gratitude to Meghan Sperry, CNM and the families who welcomed my participation in their appointments and births. With my newfound confidence and skills, I look forward to increasing choice in care for all future birthing people.

<https://gentlelanding.com/>

## **P70 4<sup>th</sup> Judicial District Attorney's Office, Colorado Springs, CO**

**Student Intern:** Adley Vogel

**Major:** Philosophy

This summer I had the opportunity to gain valuable experience with the day-to-day workings of the U.S. criminal justice system while at the 4<sup>th</sup> Judicial District Attorney's Office in Downtown Colorado Springs. As a Legal Assistant, I was responsible for creating and updating victim/witness lists as new information came in, reading through law enforcement reports for the purpose of data entry, accurately closing cases pursuant to court proceedings to generate accurate analytics regarding plea deals and convictions, and sealing cases. I was also given the opportunity to electronically subpoena witnesses and attend court proceedings to see the ways in which my work in the office impacted the outcomes of trials. It was fascinating to approach the work with a critical lens, having some assumptions about DA work validated, while having others challenged, and ending the summer with a more thorough appreciation for the interplay between local legislatures, social programs, and law enforcement agencies.

## **P71 Society for Menstrual Cycle Research, Bethesda, MD**

**Student Intern:** Xinran Wang '25

**Major:** Psychology and Philosophy

During my Summer Internship with the Society for Menstrual Cycle Research (SMCR), I engaged in diverse tasks that honed my research, organizational, and problem-solving skills. I conducted research on airport transportation and crafted informative documents for conference attendees, demonstrating my adaptability. Utilizing Canva, I formatted the SMCR conference program. During the conference, I supported registration and provided technical and emotional support to presenters. Post-conference, I applied academic knowledge by formatting a Qualtrics survey for my boss, reaffirming the real-world applicability of my skills. By prioritizing attention to detail and being ready to assist in any capacity required, I contributed to streamlining and reducing stress for my supervisors. Through a combination of empathy and a supportive attitude, I extended both technical and emotional assistance to attendees, making their experience more comfortable and manageable. [www.menstruationresearch.org](http://www.menstruationresearch.org)

## **P72 Cottonwood Environmental Law Center, Bozeman, MT**

**Student Intern:** Alex Weinman '24

**Major:** English

This summer I ran the social media accounts for Cottonwood Environmental Law Center, a nonprofit in Bozeman, Montana, that uses the law to fight for clean water, healthy ecosystems, and public land preservation. Over the course of the summer, Cottonwood videos were viewed over 2.5 million times between Instagram and Tik Tok, and our following grew from less than 1000 to over 33,000. Most of the videos I filmed and edited focused on our current cases, including Clean Water Act violation suits against a few large private developments in Big Sky. Recently, the Mountain Gazette, an outdoors-culture publication based in Boulder, accompanied us as we sampled algae blooms in a tributary of the Gallatin River. That story will be published in the Spring 2024 issue of the magazine. Cottonwood is a member-based organization, and we file our lawsuits on behalf of those members. This summer, membership has risen by a considerable amount, as has one-time donations. It's been a really rewarding opportunity to help share Cottonwood's message to a broader audience, which in turn has helped our small grassroots firm run more effectively. [www.cottonwoodlaw.org](http://www.cottonwoodlaw.org), follow us @cottonwoodlaw (Tik Tok and Instagram)

## **P73 SiriusXM, New York City, NY**

**Student Intern:** Olivia Xerras '24

**Major:** International Political Economy

At SiriusXM, I worked with the Client Services department to form a better understanding of how advertising and sales operated within the company structure. Coming into the office two days and being remote three days a week offered the perfect work-life balance to complete my learnings and assignments. I met with over 30 Account Managers to shadow and oversee the quote-to-cash process. After having a firm grasp of this process and with the guidance of my mentor and manager, I successfully executed my final project in which I revised two systematic websites to be more current and purposeful for Account Managers. Throughout this revision process, I adapted to ask better questions in company meetings and be more prepared when getting the chance to talk to executives inside the revenue and programmatic departments. I left this internship with a greater desire to pursue future jobs focusing on sales, marketing, and potentially within the creative marketing realm. [www.siriusxm.com](http://www.siriusxm.com)

## **P74 Samlyn Capital, New York, NY**

**Student Intern:** Jake Zaas

**Major:** Economics

This summer, I worked as a junior summer analyst for Samlyn Capital, a traditional long/short hedge fund in Manhattan. During the 6 week program, our small team of interns completed rotations with the different sector heads including financials, consumer goods, and industrials (focused on green energy). Our group researched public companies alongside senior analysts as they analyzed sell-side research, spoke to analysts in different fields, and modeled current and future positions for the firm. We were able to directly interact with management while attending investors conferences such as the Bernstein Equity Research Conference. Finally, we capped off the program by completing an industry report, followed by a specific stock pitch after speaking to the firm's analysts, equity researchers, as well as company management.

## **P75 University of Illinois Champaign-Urbana, Urbana, IL**

**Student Intern:** Fengyan (Carol) Zhang '24

**Major:** Physics

My 10-week research experience at the University of Illinois Urbana-Champaign mainly consisted of two parts. The theoretics part extended from the solid states physics class I took at Colorado College before the beginning of the research and dived into the different types of junctions and transistors. The application part includes working in a cleanroom for capacitor construction and characterization as well as inspection of the oxide surface under a Scanning Electron Microscope (SEM). The reason why we are interested in the oxide is that we aim to improve the breakdown field of the oxide so that it can be used under circumstances where high voltage is present. By the end of the research, the skills that I am relatively comfortable with in the cleanroom are: Silicon wafer cleaning, Silicon wafer cleaving, Silicon wafer organic contaminates cleaning, Silicon wafer BOE cleaning (remove oxide), Atomic Layer Deposition (ALD), Electron Beam Evaporation(E-beam Evaporation), Ellipsometry.

# NON-PRESENTATION INTERNSHIPS

## **Center for Applied NonViolent Actions and Strategies (CANVAS), Belgrade, Serbia**

**Student Intern:** Nina Antonio '25  
**Major:** International Political Economy

As a nonprofit organization whose mission is to advocate for nonviolent resistance to countries in conflict, CANVAS has worked with human rights and pro-democracy groups from 50 different countries. Since its founding in 2004, CANVAS has held educational workshops and built powerful movements in modern society based on extensive research and years of experience. Because of Summer Internship Funding, I had the incredible opportunity of traveling to Belgrade, Serbia to work with and learn from world renowned activists. My responsibilities as an Analytical Research Intern included writing descriptions and weekly articles about current events and conducting research on countries whose activists work with CANVAS. I also advertised their annual speaker session events via email and social media, as well as directly communicated with its attendees. This internship has not only shown me a clearer path of what I want to do after college, but it also allowed me to live and work in a foreign city, which are experiences that I am very grateful for.

## **Generation Teach, Denver, CO**

**Student Intern:** Lily Bauer '24  
**Major:** English Major

This past summer I served for AmeriCorps at a middle school in southwest Denver teaching law. It was an amazing experience that allowed me to get real hands-on teaching experience. Not even as a Teacher's Assistant, but a solo teacher, I was even allowed to create my own lessons! The mentorship I received guided me towards what I want to focus on after college. As part of the program, I got to work with ~20 other fellows, form great friendships, learn in practice, and to live in a new city. Additionally, the full-time teachers that mentored me provided amazing support and resources. Teaching was more of a challenge than I expected going into this program. But the students and experience in general is one that I will never forget in its significance to me. Before the summer I thought I wanted to be an English teacher, but now I know that it's a field that is not for me because I tried it to find out. If anyone is considering law school, teaching, education, or really just looking for a job working alongside peers, Generation Teach is awesome.

## **HomeFullOfClothes, Berlin, Germany**

**Student Intern:** Barbara Bilic '24  
**Majors:** Integrative Design and Architecture, German Studies

This summer I completed an internship at HomeFullOfClothes, a Berlin vintage designer shop, which provided me with diverse creative experiences in sustainable fashion. My role centered on curating online content, enhancing the shop's digital presence through graphics which aligned with the brand's aesthetic. Collaborating with influencers, I styled unique looks, highlighting vintage pieces and gained hands-on experience in photoshoots. Attending Berlin Fashion Week as a part of the HomeFullOfClothes exposed me to cutting edge designs and trends. The experience expanded my network, connecting me with innovative designers and peers. My photography, styling and design skills were given an opportunity to expand by refining my eye for detail and composition. Overall, the internship propelled my growth as a creative with a passion for sustainable design, by deepening my understanding of the fashion industry, and fueling aspirations for meaningful collaborations in this dynamic field.

## **Hammer Health Sciences at Columbia University Irving Medical Center, New York, NY**

**Student Intern:** Matt Cronin '24  
**Major:** Biochemistry

This summer I had an excellent time as an undergraduate researcher in the Steckelberg lab at the Columbia University. The Steckelberg lab studies RNA through a viral lens, observing RNA's structure and function and how viral RNA interacts with host cell machinery. In the Steckelberg lab I helped Ph.D. student Jeanine Gezelle to elucidate the structure of a viral RNA found in crop infecting viruses. This RNA is particularly interesting because of its ability to completely avoid degradation by certain host defense mechanisms. We have found this resistance to be based on RNA structure rather than sequence. This summer I worked to solve that structure through X-ray crystallography. I set up crystal trays and successfully grew many RNA crystals. We obtained X-ray diffractions at the Brookhaven National Labs NSLS2. After processing these diffractions, we were able to begin modeling the structure of our RNA. Working in the Steckelberg lab showed me how fun working in a lab can be and taught me how to be a better scientist and researcher. [www.steckelberglab.org/](http://www.steckelberglab.org/)

## **Charthouse Films, San Diego, CA**

**Student Intern:** Josh Fairmont '25  
**Major:** Film and Media Studies

Over the summer I had the opportunity to intern for Charthouse Films in San Diego. Charthouse Films is an end-to-end creative video production company that brings impactful stories to the screen. During my time with them, I was able to work on many different projects with various responsibilities. On days in the office, I worked on research for documentaries, and script breakdowns, helped on sets, gear organization, rentals, and helped everyone with the many tasks at hand. The last three weeks of the internship were spent in L.A. where I worked as a production assistant (PA) on the set of a TV show that they were producing. As a PA I helped with whatever was needed, primarily setting up all production equipment, locking down the set, helping to eliminate issues that arose, and driving the grip truck to and from set every day. The skills that I learned from these responsibilities are skills that will benefit me my whole life and have provided me with opportunities to try new areas of filmmaking. This past summer interning with Charthouse Films has assured me that I want to pursue a career in film, as well as taught me many invaluable skills and life lessons; not to mention the extraordinary friendships that were formed along the way. <https://charthousefilms.com>

## **New Apostle Gallery and Gerben Fine Art, New York City, NY**

**Student Intern:** Lindsey Gulau '24  
**Major:** Art - Museum Studies

For my summer internship experience, I worked for two fine art galleries based in New York City. New Apostle Gallery is owned by artist David Hollier. He is mainly an icon painter, using texts to bring his subject to life. While he was in residence for Silverstein Properties at 3 WTC, I assisted him in his preparation for the Hamptons Fine Art Fair. Including, increasing his social media presence, coordinating with his collectors, and bringing in new buyers at the fine art fair. Interning for him gave me a wonderful entrance into the art world as I saw the behind the scenes of art moving from the artist, to the gallery, and finally to the buyer. At Gerben Fine Art, I similarly worked closely with the owner, Paul Gerben. At this internship however, I worked mostly in sales outreach as I researched and built relationships with possible new collectors. Part of working for him included operating his 8,000 sq ft space in Tribeca, giving me the opportunity to learn how best to showcase artwork and sell to patrons of the gallery. I have always been passionate about art but both these internships gave me a much deeper understanding of the patron and artist relationship behind the deals. [www.gerbenfineart.com](http://www.gerbenfineart.com)

## **Kellendonk Lab, New York City, NY**

**Student Intern:** Aine Kaminski '25

**Major:** Neuroscience

The overarching goal of my internship was to narrow down the window for which the cognitive symptoms of schizophrenia develop as well as reaffirm the role it plays in the inhibition of the thalamo-cortical tract/ pathway and its involvement in the deficits of cognitive symptoms. Additionally, explore if cholinergic drugs that aid in attention deficits in Alzheimer's patients could help aid in lessening the cognitive symptoms of schizophrenia. My responsibilities in the lab were to run attentional set shifting tasks with mice that had received anterograde and retrograde viruses injected into thalamocortical tract. Behavioral tasks extended upon four days composed of different tasks. Also using a vibratome, I sectioned brain tissue of mice that had undergone the behavioral set shifting in order to analyze brain anatomy and pathway activity. Post sectioning, I performed immunohistochemistry staining of the brain sections as well as mounting sections on microscope slides to be analyzed and imaged.

## **Mitäreko, Libertad, San Jose, Uruguay**

**Student Intern:** Manuel Macedo, Dec. '23

**Major:** Anthropology

This summer (winter in Uruguay) I worked for 12 weeks in an after-school program that worked with children who live in poverty and/or are disabled. I worked as a social programmer and evaluation coordinator, conducting research to oversee an institution's evaluation, creating multiple trainings for the teachers on ADEI, and conducting recreational workshops for the 60 kids. I got to apply skills that I learned through the Bonner Fellowship, CC Mobile Arts, and my major at CC, from how to do participant observation, to dance workshops for the kids. This experience has led me to further appreciate the role of community-based research and social work.

## **NGO Sustainability, Norwalk, CT**

**Student Intern:** Luke Magistad '24

**Major:** Environmental Science

NGO Sustainability, a UN Consultative Status nonprofit, advocates sustainable development and renewable energy to raise environmental awareness. The NGO represents three United Nations Economic and Social Council accredited organizations: International Solar Energy Society (ISES), Bangladesh Women Chamber of Commerce and Industry (BWCCI), and Central and North Pakistan Women Chamber of Commerce and Industry (WCCI) promoting sustainable development, renewable energy, and the advancement of women. Their activities include hosting events at their headquarters in New York and fostering UN, NGO, government, academic, and private sector partnerships. They also share educational content and have intern-led sustainability studies and projects. In my role this summer, I contributed to the website development team and was introduced to Wix. I also completed multiple independent special topic reports ranging from gravity-based energy storage to biogas alternative fuels.

[www.unngosustainability.org/](http://www.unngosustainability.org/)

## **Fairview Capital Group, New York City, NY**

**Student Intern:** Peyton Murphy '24

**Major:** Mathematical Economics

This summer I interned at Fairview Capital Group, a private equity advising firm in New York City. Fairview Capital Group advises on GP-led secondary transactions with the ultimate goal of liquidation. During my internship, I was responsible for: creating valuation/comp reports, conducting financial analysis and building excel-based financial models, creating components of Confidential Information Memorandums, researching the buyer market, writing briefings for new buyers, and re-structuring the company data library to be up-to-date and accessible. In addition to the responsibilities allocated to me, I was taught a curriculum about the secondary market, GPs, LPs, and deal structure which provided me a much deeper insight and understanding into the industry. Each week, I went out to coffee or lunch with two of the members of the office and learned about each of their experiences in finance. It was helpful to hear a diverse group of perspectives and approaches on the industry and helped me develop my path forward after the conclusion of my internship.

## **Washington Square Films, Manhattan, NY**

**Student Intern:** Ruby Murray '25

**Major:** Film and Media Studies

Washington Square Films is a production and management company based in Manhattan and Los Angeles. The company mainly focuses on independent films and filmmakers, but its focus on commercial advertising sets them apart from other independent film production companies. While I was there, the company was in production with Lay's Chips, including two films that will be released next year. The company uses its space for production purposes but also has spaces for editors and directors to work directly from the office. My favorite part of the job was the script coverage I did. I read many scripts and decided whether they should be passed or considered for the company to produce. This was an opportunity to use my academic brain alongside my creative brain. Besides that, my tasks included lots of organizing, inventory, and general office upkeep. This was an excellent opportunity to see the ins and outs of an office, particularly in a field I am interested in.

## **Spores Network, Hanoi, Vietnam**

**Student Intern:** Nam Ninh '25

**Major:** Mathematical Economics

This is my first on-site internship, but I can say it might be one of the best working experiences I would ever have. Onboarding as a Financial Analyst and Research Intern, I had the chance to do thorough research into a multiplicity of Web3 and blockchain projects. I am also involved in 9 IPO deals via building financial models to calculate fully diluted valuation, initial market cap, unlock percentage, vesting schedules; tracking sale progress; and communicating with founders regarding listing schedules on centralized exchanges. Additionally, I led due diligence in Spores' Accelerator program by shortlisting 250+ applicants into 12 finalists, made slide decks for the Investment Committee consisting of 20+ of Vietnam's leading investment funds and 10+ top-notch global VCs, and hosted offline roadshows in collaboration with Vietnam Blockchain Association. Outside of office work, the culture is amazing as our team often eats out together and has great bonding sessions. I also got to know my COO on a personal level. I highly recommend the internship program at Spores!



## **Power Arm Performance, Ramsey, NJ**

**Student Intern:** Logan Will '24

**Major:** Business, Economics, & Society

Power Arm Performance is an elite sports performance training center based in Ramsey, NJ. During my time at Power Arm, I had the pleasure of meeting and training many athletes ages 10-23. My favorite part of my experience was learning about programming and periodizing for different sport athletes, as well as the technical feedback I received and gave during training sessions. Power Arm is committed to offering a full-service, science-backed strength and conditioning approach that is non-discriminatory to propel athletes forward. Working with a genuine, motivated, and experienced crew gave me an appreciation for the intricacies of sports performance and taught me how we can individualize, and therefore maximize, plans for athletes to get better. <http://www.powerarm.co/>

## **Food to Power, Colorado Springs, CO**

**Student Intern:** Mia Zuckerberg '24

**Major:** Psychology

This summer, I had the pleasure of interning at Food to Power (FTP), a local food justice non-profit dedicated to building a more equitable food system. As an intern, I rotated among departments such as Food Production, Food Access, and Advocacy. My time in Food Production was spent working in the onsite garden, planting and harvesting alongside volunteers. Later in the week, I saw the food we harvested go out to participants in our No-Cost Grocery Program. In another weekly program, our team collaborates with a local vet to provide animal health care and food to pets and people experiencing houselessness in the Springs. While working in Advocacy, I had the opportunity to visit local businesses, attend town halls, and meet others working for food justice all over Colorado. Overall, my time at FTP was incredible. I am leaving the experience feeling inspired and more connected than ever to the Springs community. <https://foodtopowerco.org/>



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