



Carleton

UNDERGRADUATE STUDENT RESEARCH AND INTERNSHIP SYMPOSIUM

LIVE CHAT

4:00 - 6:00 PM

OCTOBER 16, 2020

www.carleton.edu/research/symposium-2020/

October 16, 2020

Welcome to the 2020 virtual Student Research and Internship Symposium and Celebration at Carleton. Today we honor the many students who have explored career paths and engaged in advanced work in their respective fields, building on the knowledge and skills they acquired throughout their work both at Carleton and on off-campus programs.

Experiential learning via research, internships, and fellowships are at the heart of a Carleton education. Through their posters and oral presentations these students reveal the habits of mind that an outstanding liberal arts education provides – curiosity, adaptability, careful observation, reflection, and compelling communication. We are proud of their accomplishments.

We also wish to acknowledge and celebrate the great diversity of experiences represented here. Staff and faculty from many different departments and programs have supervised student research and internship projects, and community members have helped students to grapple with how their knowledge, skills, and values play out in the complexity of the real-world. Taken together, the work of these students attests to the breadth of experiential learning opportunities afforded by Carleton and the many ways in which faculty and staff throughout the College inspire and support student scholarship and plant the seeds for life-long learning.

Finally, we call attention to the many significant mentoring relationships that fostered this work and were deepened as a result of it. As generations of Carleton students will attest, the opportunity to work closely with faculty and staff is among the most impactful and memorable of their experiences here. Behind each of these presentations is a faculty, staff, or community member whose guidance, encouragement and coaching enriched the education of students and inspired them to go further than they imagined they could. We are grateful for the dedication and attentiveness of all these mentors.

We invite you to engage with these students, to question them about their work and its significance to them and the world. In this way, we hope you will join them, at least briefly, on the journey they have undertaken. Please contact Danette DeMann (ddemann@carleton.edu) if you haven't already RSVP'd and would like to gain access to sign up and fully participate in this event.

Thank you for joining us for this symposium and celebration.

Bev Nagel, Dean of the College

Carolyn H. Livingston, Vice President for Student Life and Dean of Students

Sarah Allaben

Class Year: 2021

Major(s): Biology

Supervisor(s) and affiliation or institution: Daniel Hernandez (Associate Professor of Biology and Chair of Biology, Carleton College)

Title: *Effect of Herbivory on Plant Communities in Restored Tallgrass Prairie*

Informed tallgrass prairie management and restoration decisions require an understanding of the drivers which influence these threatened ecosystems. Herbivores, for instance, have been found to alter grassland community structure through selective herbivory and alteration of nutrient cycling, yet the specific effects of mammalian herbivores such as white-tailed deer (*Odocoileus virginianus*) and meadow voles (*Microtus pennsylvanicus*), whose presence in prairie has often increased since the decline of bison (*Bos bison*), remain unclear. To investigate the impact of native mammalian herbivores on plant community composition and diversity, an herbivore enclosure experiment was conducted within 4 prairie restoration blocks in southeastern Minnesota. Cover and diversity measurements of 49 plant species in plots that were either accessible or inaccessible to large, medium, or small herbivores for 9 years were compared with pre-experimental measurements. Initial analysis suggests that exclusion of large herbivores may suppress diversity, though the strength of this trend differed among restoration blocks.

This experience was funded by: Muir Fund (Biology Department)

Live chat from 5:00 - 6:00 p.m.

Miles Allen

Class Year: 2021

Major(s): Political Science/International Relations

Title: *Legality and Scope of the Arms Trade during the Syrian Civil War*

This summer, I analyzed the legality of arms transfers made to the Syria Arab Republic since the civil war began in 2011. After compiling a list of the arms transfers documented in investigative media reports, field research, and open source intelligence databases, I reviewed literature on International Humanitarian Law and multilateral treaties to identify instances in which governments violated the law by sending weapons to Syria.

This experience was funded by: David T.C. Jones '74 Endowed Internship Fund (Career Center)

Live chat from 4:00 - 5:00 p.m.

Katie Babbit

Class Year: 2021

Major(s): Sociology/Anthropology

Title: *Gender-Based Violence in Environmental Sectors*

This summer, I virtually interned at Khulisa Social Solutions, a non-profit based in South Africa that works with communities throughout the country to address social vulnerabilities and inequalities. Throughout the summer, I focused on researching interventions that address gender-based violence in environmental sectors and developing a proposal for a USAID funding challenge.

This experience was funded by: Robert E. Will '50 Endowed Internship Fund in Social Entrepreneurship (Career Center; Part of the Global Edge Program)

Live chat from 5:00 - 6:00 p.m.

Ella Barzel

Class Year: 2021

Major(s): Religion

Title: *A Summer with Isaiah; COVID-19, BLM, and the Elections*

Over the summer I worked as a communications intern for Isaiah, a multi-racial, state-wide, nonpartisan coalition of faith communities based in Minneapolis, MN. As a Religion major at Carleton, this was a unique opportunity to work with an organization that leverages the power of religious institutions to address important social justice issues, especially during a summer as eventful as this one. During my time with Isaiah, I worked with the communications team on a variety of social media campaigns that utilized specific narrative shifting language and storytelling to convey our message across race, class, and religious lines. My summer with Isaiah was wonderful and emphasized how incredible a diverse, representative cohort of congregations is able to build real relationships with the communities most affected by a variety of social issues.

This experience was funded by: Social Justice Internship (Chaplain's Office)

Live chat from 4:00 - 5:00 p.m.

Carly Bell

Class Year: 2021

Major(s): Religion

Title: *Communications Fellowship at the Northfield Area Family YMCA*

This summer I worked remotely as a Communications Fellow at the Northfield Area Family YMCA. My work consisted of designing and writing content for a monthly newsletter, as well as other communications materials such as advertisements, flyers, and signs. I also translated documents into Spanish, conducted brand research, and crafted interview questions for donors and partner organizations. This experience gave me the space to practice and more fully develop some of the writing and design skills that I have been learning over the past few years while working at the CCCE at Carleton. In doing so, I became increasingly confident in my ability to transfer my communications skills to new contexts at other organizations, which has encouraged me to apply to communications jobs after I graduate from Carleton.

This experience was funded by: Weitz Family Foundation Gift (Center for Community and Civic Engagement)

Live chat from 5:00 - 6:00 p.m.

Cassidy Bins

Class Year: 2022

Major(s): English

Title: *Science Writing & Research Internship with Concussion Alliance*

This summer, I interned remotely with Concussion Alliance, a Seattle-based nonprofit dedicated to making concussion research accessible to patients and their families. I learned about the pathophysiology of concussions, attended guest lectures by top researchers, and contributed regularly to the Concussion Update newsletter. Additionally, I worked on a number of independent projects, including creation and design of Concussion Alliance's first-ever media kit and a substantial revision of their "Emotional Wellness" webpage. Throughout the summer I was able to hone my science writing skills and practice parsing scientific literature.

This experience was funded by: Trace McCreary '89 and Alissa Reiner Endowed Internship Fund (Career Center)

Live chat from 4:00 - 5:00 p.m.

Alison Block

Class Year: 2022

Major(s): Chemistry

Other Authors/Contributors: Max Gjertson, Jevon Robinson, Seth Warner, David Wilson

Supervisor(s) and affiliation or institution: Joe Chihade (Professor of Chemistry, Carleton College)

Title: Improving Prediction of Helminth Aminoacyl tRNA Synthetases through RNA Sequencing and Computation-Based Genomic Approaches

Helminths are parasitic worms that negatively impact health outcomes for a quarter of the global population. Although more than 150 helminth genomes have been sequenced, the protein sequence predictions present in compiled genomes and public databases are often incorrect. This hinders identification of novel drug targets in helminth genomes. Our project's focus is on aminoacyl-tRNA synthetases, which are known to be effective therapeutic targets in other organisms. Using the published genomes from a set of twelve human-infecting helminths, we identified and corrected the predicted aminoacyl-tRNA synthetase genes. We utilized Wormbase, a publicly available database, to correct exon boundary predictions using RNAseq data. The proposed protein sequences were validated using multiple-sequence alignments between helminths and model organisms, allowing us to identify helminth-specific gene features. We confirmed a high error rate in predictions of the studied genes (60%), and plan to continue this work by further characterizing the corresponding proteins.

This experience was funded by: Carleton Chemistry Department

Live chat from 5:00 - 6:00 p.m.

Henry Bowman

Class Year: 2023

Major(s): Undecided

Supervisor(s) and affiliation or institution: Dr. David Parrish (NOAA Chemical Sciences Laboratory, Cooperative Institute for Research in Environmental Sciences)

Title: Exploring the Shifting Seasonal Tropospheric Ozone Cycle Through Mathematical Analysis of CMIP6 Earth System Models

CMIP6 Earth System Models simulate seasonal tropospheric ozone cycles that change both in magnitude and in phase over time, growing and shifting to later in the calendar year from the 1950s (as anthropogenic precursor emissions rose), reaching a maximum in the 1980s, then decreasing and shifting to later in the calendar year as emission controls began. To examine the shift in the seasonal cycle, we analyzed model-produced data sets of up to 165 years of monthly average ozone concentrations at three sites situated at different altitudes in Western Europe. (When available, measured data sets spanning up to 40 years were analyzed for additional comparison.) Monthly mean ozone concentrations were fit to a 15-parameter equation that includes components describing long-term changes, the baseline seasonal cycle, and the shift in the seasonal cycle in response to changes in ozone precursor emissions. Across sites and models, the parameters describing the shift in the seasonal cycle were fairly consistent, indicating that the shift is characteristic of at least mid-latitudes in Western Europe. Further analysis will reveal if the scope of the seasonal cycle shift includes other Northern-mid-latitude countries in North America and Europe. Qualitatively, data sets of ozone precursor emissions match the seasonal cycle shift we observed; however, further quantitative analysis is needed to determine the magnitude to which the seasonal cycle is affected by precursor emissions.

This experience was funded by: Dr. David Parrish (NOAA Chemical Sciences Laboratory, Cooperative Institute for Research in Environmental Sciences); Littell Internship Fund (Career Center)

Live chat from 4:00 - 5:00 p.m.

Ella Boyer

Class Year: 2021

Major(s): Religion

Title: *Organizing to End Homelessness with Beacon Interfaith Housing Collaborative*

Beacon Interfaith Housing Collaborative is an organization based in Minneapolis dedicating to ending homelessness. They work in three branches with a wide range of Churches, Synagogues, and Temples to provide emergency shelters, develop and build affordable housing, and campaign for policy that will end homelessness and provide housing security for all minnesotans.

This experience was funded by: Social Justice Internship (Chaplain's Office)

Live chat from 5:00 - 6:00 p.m.

Grace Brindle

Class Year: 2021

Major(s): History

Title: *Understanding How the Library of Congress Makes Documents Accessible to the Public*

This summer, I interned with the Library of Congress as a Remote Metadata Intern. I was responsible for identifying metadata for over 2,500 laws passed by Congress as part of the Statutes at Large project. My daily responsibilities included reading historical statutes from the 1920s and entering the appropriate metadata into a spreadsheet, with the goal of integrating this information into the Law Library's database. The purpose of this project was to make the Statutes at Large collection more accessible to the public and academic researchers. Through this internship, I gained valuable experience interpreting congressional acts, identifying metadata, and learning more about a career in library and information science.

This experience was funded by: Endowed Internship Fund for Public Service (Career Center)

Live chat from 4:00 - 5:00 p.m.

Lorraine Byrne

Class Year: 2021

Major(s): Geology

Title: *Internship Reflection: Coal Combustion Residuals Intern*

In 2015, the EPA passed legislation that would regulate the safe disposal of coal combustion residuals. Given that the United States has been burning coal for hundreds of years and that regulations and legislation have only recently been passed, the division has a lot of work to do. This includes assessing active plants while also reviewing and monitoring plants and storage units that have already been closed. To ensure toxic chemicals are not leaking into groundwater, combustion plants must install monitoring wells that track levels of given toxins leaving their storage units and facilities. One of my main tasks for the summer was finding and compiling monitoring well drill information and data. Under the new law, sites must publish their drill logs and data, but there is no specific format. I was in charge of compiling all the data into an Excel spreadsheet. I also evaluated and analyzed corrective measures assessments for compliance with federal code.

This experience was funded by: Helen Golde '85 Endowed Internship Fund (Career Center)

Live chat from 5:00 - 6:00 p.m.

Eway Cai

Class Year: 2023

Major(s): Undecided

Supervisor(s) and affiliation or institution: Gretchen Hofmeister, Professor of Chemistry, Carleton College

Title: *A Phosphinic Acid is a Good Mimic for Understanding Catalyst-Reagent Interactions in a Desymmetrization Reaction*

Asymmetric desymmetrization of cyclic anhydrides is an important reaction using organic catalysts with many applications. These catalysts are chiral in nature, meaning that they are not identical to their mirror image, just like our hands. We call two compounds that exhibit this characteristic enantiomers. The catalyst can lower the energies of the enantiomers' transitional states to different extents, resulting in one hand of the product being preferred over another. We designed phosphinic acids to mimic the transition state of this reaction, and evaluated their interactions with the catalyst. We discovered that the phosphinic acid binds to the catalyst consistent with the reaction selectivity. Further research efforts may focus on evaluations using computational modeling.

This experience was funded by: Donors of the American Chemical Society Petroleum Research Fund (Gretchen Hofmeister)

Live chat from 4:00 - 5:00 p.m.

Isabella Chaffee

Class Year: 2022

Major(s): Cognitive Science

Title: *Refugee and Migrant Experiences in Europe and France*

Started in 2015 in Calais, France, the non-profit organization Utopia 56 strives to help migrants and refugees who reach France in all manners materially, legally and administratively and supports them by hearing and understanding their stories and experiences. Where the French state has failed, the largely volunteer run Utopia 56 attempts to step in. This summer, I was able to work with Utopia 56's Paris branch as a remote intern, supporting their communication and relief efforts from afar. By helping them keep up to date on migrant news in France and Europe in general, I was able to both aid in their efforts to help migrants in the time of COVID-19 while also growing my own personal understanding of the European migration crisis which finds its roots all the way back in the 1960s.

This experience was funded by: The Initiative for Service Internships in International Development (Career Center); Post-Paris Internship (Center for Global and Regional Studies)

Live chat from 5:00 - 6:00 p.m.

Karen Chen

Class Year: 2021

Major(s): Environmental Studies

Title: *Surveying US State Climate Adaptation - EPA Region 10 Internship*

My primary project this summer has been to create adaptation survey reports by compiling relevant information on adaptive measures – activities which prepare for, protect against, or mitigate climate change impacts on natural & human systems. The goal is to centralize & synthesize that data into forms the EPA can use to more readily take stock of adaptation at higher scales across the nation as well as to access more detail within individual states. I also enjoyed supporting tribal adaptation resource creation.

Adaptation is high-potential, high-return work that takes place on the ground, but gets a huge leg up from governmental and institutional facilitation. Progressive areas and organizations like the R10 EPA have been developing exciting community-centered programs, especially for underserved tribal communities. Their goal is to replicate and scale these up as soon as possible. Hopefully, my work will reduce effort duplication and inform decision-making in incredibly worthwhile initiatives!

This experience was funded by: Jean Phillips Memorial Internship Grant (Career Center)

Live chat from 4:00 - 5:00 p.m.

Bethstyleline Chery

Class Year: 2021

Major(s): English

Supervisor(s) and affiliation or institution: Kofi Owusu (Professor of English)

Ariana Estill (Professor of English and American Studies, Director of American Studies)

UChicago Summer Research Training Program

Title: *Understanding Blackness Through Black Romance Narratives*

In his 1997 Black romance novel, *A Do Right Man*, Omar Tyree utilizes the romance genre to explore how love, particularly romantic love, functions in shaping Black heterosexual males' outlook on life as well as how it shapes others' opinions of him. Many critics of the romance genre, particularly critics of Black romance narratives (in both novels and films), often criticize the genre for promoting stories that either popularize negative stereotypes about Black people (i.e. stories that rely on tropes such as the Jezebel, Welfare Mother, Black lady, and the educated Black bitch and the lascivious, aggressive Black man to promote "Blackness") or focus on promoting Black respectability (marketability) by privileging Black middle to upper-middle-class romance narratives. Tyree's text, however, offers Black audiences the opportunity to explore Blackness by challenging negative stereotypes that plague the community. Although Tyree's work more recent works offer readers stories that are more representative of a wide range of Black people's experiences with romantic love, they are often overlooked by critics. The aim of my research is to investigate works such as Tyree's to achieve a better understanding of how romantic love and its accurate (or inaccurate) portrayal in Black romance narratives affect our overall understanding of Blackness. By investigating stories such as these I hope to emphasize the necessity of studying stories that are realistic without being detrimental to Black communities. Throughout my project, I apply theoretical frameworks of scholars such as bell hooks, Simone Drake, Belinda Edmondson, Stephen Best, and Michael Boyce Gillespie, to investigate the history of Black romance narratives and their impact on today's society. These scholars investigate how the history of slavery, institutionalized racism, and the desire to appease white audiences shape how Black stories are constructed in general.

This experience was funded by: UChicago Summer Research Training Program

Live chat from 5:00 - 6:00 p.m.

Anthony Cho

Class Year: 2021

Major(s): Physics

Supervisor(s) and affiliation or institution: Thomas Murphy (Professor of Electrical and Computer Engineering, University of Maryland), Yanne Chembo (Associate Professor of Electrical and Computer Engineering, University of Maryland) and Rajarshi Roy (Professor of Physics, University of Maryland)

Title: *An Autonomous Electronic Oscillator*

Due to their chaotic behavior, many systems cannot be solved analytically. A time delay adds further difficulty since the system becomes infinite dimensional due to their time evolution depending on an entire time interval rather than an initial condition at a single point in time. The Mackey-Glass system is ideal for studying chaotic behavior with a variable time delay because it is simple to construct, yet contains varying behaviors depending on the time delay and gain. We added an optical component and a modulo nonlinearity to the Mackey-Glass system to achieve an autonomous optoelectronic oscillator (OEO). We report that the OEO displayed both periodic and chaotic waveforms, depending on whether it was over the modulo threshold. Also, under specific conditions, the OEO shifted between two primary frequencies.

This experience was funded by: National Science Foundation REU (University of Maryland)

Live chat from 4:00 - 5:00 p.m.

Leander Cohen

Class Year: 2022

Major(s): Political Science/International Relations

Title: *My Internship at Good Counsel Services*

This summer, I worked as a legal intern at Good Counsel Services, a New York-based legal services non-profit. Over the course of the internship, I assisted lawyers in providing 1-on-1 legal assistance for non-profits and social impact startups, researched topics in employment, tax, and intellectual property law, led a team of three interns on I-589 asylum case, and wrote articles for the organization's website as co-lead of the civil rights team.

This experience was funded by: Robert E. Will '50 Endowed Internship Fund in Social Entrepreneurship (Career Center)

Live chat from 5:00 - 6:00 p.m.

Madison Collins

Class Year: 2022

Major(s): Psychology

Other Authors/Contributors: Natalie Mun

Supervisor(s) and affiliation or institution: Sharon Akimoto (Professor of Psychology, Carleton College)

Title: *The Effects of Perspective Taking on Climate Change and Environmental Attitudes*

Previous research has shown that perspective taking (PT) improves environmental attitudes when the stimulus involves a futuristic person who is suffering due to climate change (e.g., Pahl et al., 2013), but not when present worry is expressed about future suffering. In our study, participants took the perspective of a child who was concerned about future climate change. We predicted that PT would enhance environmental attitudes, reduce climate change denial, and that psychologically distant (PD) individuals would benefit most from PT. Contrary to what we predicted, psychologically close individuals had more positive environmental attitudes after PT. Regarding climate change denial, PT had a marginally significant effect, but was not moderated by PD. Political views and empathic concern were correlated with climate change and environmental attitudes, replicating previous findings. This study provides preliminary evidence that thinking about future suffering could alter climate change and environmental attitudes, particularly among psychologically close individuals.

This experience was funded by: Carleton Psychology Department

Live chat from 4:00 - 5:00 p.m.

Madison Collins

Class Year: 2022

Major(s): Psychology

Title: *Summer Research Internship at the University of Chicago DIBS Lab*

This summer, I completed a research internship at the Developmental Investigations of Behavior and Strategy (DIBS) Lab at the University of Chicago. The DIBS Lab studies social development in children (ages 4-12), particularly relating to topics such as fairness, morality, equity, and language. In addition to general lab maintenance tasks (i.e. recruiting and scheduling participants), my main project this summer was working on a research study examining how children use hesitations or disfluencies in speech (i.e. "umm") to infer knowledge or preference about an object. As a part of this project, I conducted literature reviews, designed and inputted study stimuli into Qualtrics, and ultimately ran study appointments with children. Working at the DIBS Lab was an invaluable experience as I gained new research skills and improved upon many others. In addition, this experience helped me to clarify my plans for graduate school and solidify my passion for psychological research.

This experience was funded by: Eugster Endowed Research and Internship Fund (Career Center)

Live chat from 5:00 - 6:00 p.m.

Josie Conn

Class Year: 2021

Major(s): Biology

Other Authors/Contributors: Annabella Strathman

Supervisor(s) and affiliation or institution: Jennifer Wolff (Professor of Biology, Carleton College)

Title: *Evaluating the Effect of Dominant Tallgrasses on Nematode Biodiversity in Restored Tallgrass Prairie*

This investigation seeks to understand the effect of tall grassland restoration on nematode community structure, continuing an ongoing project from 2016. In the Carleton arboretum, 12 plots were separated into four treatments: with or without both soil and long grasses. Soil samples from each treatment group were collected yearly from 2016-2020. The earlier samples underwent nematode extraction, lysis and sequencing using various primers. Based on preliminary results, samples amplified using the primers Euk1391 and NF1_18Sr2b were selected for further investigation. Using Mothur bioinformatics software, each sample's nematode DNA was grouped into Operational Taxonomic Units (OTUs), and the composition was compared. The analysis of both primers using Mothur and RStudio suggest that the presence or absence of grass influences the nematode community composition.

This experience was funded by: Muir Fund (Biology Department)

Live chat from 4:00 - 5:00 p.m.

Allison Corlett

Class Year: 2021

Major(s): Psychology

Other Authors/Contributors: Paula Frankl

Supervisor(s) and affiliation or institution: Sarah Meerts (Associate Professor of Neuroscience and Psychology, Director of Neuroscience, Carleton College)

Title: *Paced mating behavior is influenced by duration of post-ejaculatory interval*

Female Long-Evans rats given 30 minute paced mating tests showed longer contact-return latencies to ejaculation relative to rats given 15 intromission tests. Test parameters are understood to affect the display of paced mating behavior; however, inconsistencies make comparison difficult. We conducted a systematic investigation to clarify the effect of testing parameters on paced mating behavior. Specifically, we tested whether the lengthened contact return latency to ejaculation observed in 30 minute relative to 15 intromission paced mating tests could be explained by a Long or Short post-ejaculatory interval (PEI), mating with one or multiple males, or ejaculation intensity. Manipulating PEI duration led to differences in paced mating behavior. Rats in the Long PEI condition exhibited shorter exit latency to intromission, longer contact-return latency to ejaculation, and longer withdrawal duration after ejaculation. The findings point to the importance of the physiological response of the female on the display of paced mating behavior.

This experience was funded by: Carleton Psychology Department

Live chat from 5:00 - 6:00 p.m.

Alé Cota

Class Year: 2022

Major(s): GWSS, Latin American Studies

Title: *Queer-Romancing: Queer Nonbinary of Color Manifesto*

Queer and feminist studies as disciplines have historically excluded from their modes of analysis the most marginalized groups such as trans people of color. In response, I draw on the literature of queer utopia, decolonial love, and love ethics. I introduce a sustainable trans, queer, feminist of color methodology that I call queer-romancing. Through queer-romancing, we are able to scrutinize in more depth, the liberal erasure of queerness that has endangered queer, trans communities of color. This contribution imagines new ways of loving that compel us to love each other more than we hate the State. Queer-romancing then develops mechanisms to resist, organize, and mobilize against the structural violence inflicted on our bodily landscapes. It is this particular strategy, I argue, that will allow us as gender queer,

marginalized people, to process trauma and shame. Only then will we be able to take demonstrable strides toward a horizon of possibilities.

This experience was funded by: Mellon Mays Undergraduate Fellowship

Live chat from 4:00 - 5:00 p.m.

Eloïse Cowan

Class Year: 2022

Major(s): Biology

Title: *Being a program director for Concussion Alliance*

I took on the role of program director for Concussion Alliance's summer internship program. After almost a year of volunteering with the organization, I became part of the non-profit's leadership. This summer, I devised and led an internship with a co-worker. For the first few weeks, we led them through an educational phase which developed knowledge about neuroscience, concussion management, and public health. In the second phase, we created projects on the webpage for them to complete and helped them create resources that would help concussion patients navigate their injury. I am proud of the work I did which taught students of different background skills they can use to improve the quality of life of struggling individuals and which they can use to continue to lead the way for change.

This experience was funded by: Class of 1963 50th Reunion Fund for Internships (Career Center)

Live chat from 4:00 - 5:00 p.m.

Justin Crawmer

Class Year: 2023

Major(s): Undecided

Title: *Examining the Effect of COVID-19 on the Kidneys, Brain, and Sensory Dysfunction.*

The ongoing COVID-19 pandemic has become a world health emergency. The pathogenesis of the virus is yet to be fully explored and possibilities of permanent damage to the body has warranted many studies. Our lab investigated current studies to examine the effect of COVID-19 on the kidneys, brain, olfactory system, and gustatory system. The ability of COVID-19 to enter tissues through the ACE-2 receptor has implicated its ability to infect the kidney's, brain, and sensory systems due to high ACE2 expression in those tissues. Current studies have only shown long-term damage in severe cases of the virus. There are known risk factors for being severely infected by COVID-19 including chronic kidney disease and prior kidney transplantation as well as other organ risk factors. Further studies shall be conducted to fully understand the extent of COVID-19 on the body and to lessen the risk factors and severity of COVID-19 infection.

This experience was funded by: Kolenkow-Reitz Fund (STEM Board)

Live chat from 5:00 - 6:00 p.m.

Maris Daleo

Class Year: 2021

Major(s): Biology, Studio Art

Supervisor(s) and affiliation or institution: Mike Nishizaki (Assistant Professor of Biology, Carleton College)

Title: *Oceanic Warming and Acidification Effects on the Fertilization and Sperm Swimming Speed of Four Echinoderms*

In an era of climate change, impacts on the ocean environment include elevated temperatures and decreased pH. These effects are amplified in shallow coastal regions where conditions can fluctuate widely. This is potentially important for many nearshore species that are "broadcast spawners", releasing eggs and sperm into the water column for fertilization. I conducted fertilization experiments to assess the effects of multiple environmental stressors (pH/temperature) on sperm swimming speeds and fertilization success in four species of sea urchins and sand dollars. Results suggest that: 1) pH had no effect on sperm swimming or fertilization rate; 2) sperm swam faster under elevated temperatures for all

species and; 3) sand dollar fertilization peaked at 14°C, increased with temperature in red urchins, and decreased with temperature in green and purple urchins. These results suggest that the reproductive ecology of broadcast spawners may be more sensitive changes in temperature, rather than ocean acidification.

This experience was funded by: Towsley Endowment for the Sciences (STEM Board)

Live chat from 4:00 - 5:00 p.m.

Babi De Melo Lemos

Class Year: 2021

Major(s): Environmental Studies, Political Science/International Relations

Title: *Sustainable tourism in 2020: rethinking the 'new normal'*

Native Tours is a sustainable, community-based ecotourism operator offering authentic excursions that foster an appreciation for environmental and cultural conservation. Our mission is to show the beauty of Peru in a responsible way. We believe that responsible tourism can grant travelers a more meaningful experience while contributing to the people and places they visit. Native Tours mediates the encounter between world travelers and the local communities, who prosper from the income generated while safeguarding the rich ancestral heritage and lifestyle that makes them so unique and attractive. During my internship experience, I worked extensively with the intersection between the environmental, organizational, cultural and social application of sustainability. I was able to witness and participate in the creation of a new meaning for sustainable tourism which was defined by the challenge of operating a business based on interpersonal activities in times of social distancing and national isolation.

This experience was funded by: Robert E. Will '50 Endowed Internship Fund in Social Entrepreneurship (Career Center)

Live chat from 5:00 - 6:00 p.m.

Soren DeHaan

Class Year: 2022

Major(s): Mathematics

Other Authors/Contributors: Michaela Polley

Supervisor(s) and affiliation or institution: Rob Thompson (Associate Professor of Mathematics, Carleton College)

Title: *Enumeration of Minimal 2-Cuts on Surfaces*

Embed a graph on a surface. If cutting along the graph splits the surface into exactly two pieces, and every cut is necessary to split the surface, we call the graph embedding a minimal 2-cut. Our research describes a method to find all graphs that admit minimal 2-cuts on a genus g torus. Using topological methods, we restrict the collection of possible graphs that admit minimal 2-cuts. We begin by using the Euler characteristic to restrict the number of edges and vertices in such a graph. Graphs are further restricted by considering the properties of embeddings of subgraphs. For each graph that meets the topological restrictions, we use a modified version of a rotation system (a combinatorial encoding of a specific embedding) to confirm the existence of a minimal 2-cut. We demonstrate this process by constructing all minimal 2-cuts on the genus 1 and genus 2 torus.

This experience was funded by: Towsley Endowment for the Sciences (STEM Board)

Live chat from 4:00 - 5:00 p.m.

Nina Denne

Class Year: 2021

Major(s): Biology

Other Authors/Contributors: Athena Brooks

Supervisor(s) and affiliation or institution: Stephanie Watowich (Professor of Immunology, MD Anderson Cancer Center)

Title: *The role of STAT3-IL-10 pathway in cDC1 dendritic cells and Bone Marrow Derived Macrophages*

STAT3 is a transcription factor that keeps inflammation in check. Inhibiting the STAT3-IL-10 pathway causes increased activity of cDC1s (dendritic cells type 1). Wild type and STAT-3 knockout cDC1s were incubated with either PBS (control) or Poly I:C (stimulus). cDC1s were also treated under IL-10 stimulus. Similarly, wild type and STAT-3 knockout bone marrow derived macrophages (BMDMs) were incubated with either PBS or LPS. After 0, 3, and 6 hours, samples were collected for RNA sequencing. A variety of cytokines were upregulated in a STAT-3 and stimulus dependent manner; in the knockout cDC1s, IL12 and IL27 were upregulated, while in the knockout BMDMs, Ccl4 was upregulated. A variety of canonical pathways were upregulated in BMDMs and cDC1s, including the senescence pathway, HIF1a signaling, and TNFR2 signaling. This project leads to a better understanding of the STAT3-IL10 pathway which can serve as a gateway to immunotherapy.

This experience was funded by: CPRIT Research Training Program at MD Anderson Cancer Center

Live chat from 5:00 - 6:00 p.m.

Diaraye Diallo

Class Year: 2023

Major(s): Undecided

Title: *Virtual Marketing Internship for a South African Nonprofit Organization*

I was a virtual marketing intern at The Justice Desk in Cape Town over the summer. I developed and assisted in content creation for virtual platforms such as Instagram, Twitter, Youtube, Wikipedia, and The Justice Desk website. I curated a marketing handbook for the organization's social media usage based on research and analytics that boost engagement with the target audience as well as fundraising. I also performed market analysis and research on the latest trends. This experience has reaffirmed my desire to pursue a career that allows me to serve others. As I conducted programming, I just realized that every aspect is crucial and I vital part. Therefore, how I support disenfranchised communities can look very different in a variety of ways. I am ultimately very proud of myself because I was able to adapt to a not ideal environment and still produce work. The introspection, regardless of location, was crucial and something I would not have received unless I participated in the experience. I am very grateful to Carleton for accommodating all of our needs and still pushing us to have worthwhile, life-changing experiences.

This experience was funded by: Robert E. Will '50 Endowed Internship Fund in Social Entrepreneurship (Career Center)

Live chat from 4:00 - 5:00 p.m.

Brittany Dominguez

Class Year: 2021

Major(s): Sociology/Anthropology

Title: *From the Classroom to the Kitchen: Covid-19, Social and Cultural Capital, and Schooling*

Scholars have previously determined that students with white middle class backgrounds are equipped with the cultural know-how that is most valued in schools and have social networks that can provide both the material and intellectual resources tend to perform better in school. However, throughout this year, students have learned from their homes with the help of virtual programming and parental teaching. Since students are no longer in schools where the white middle class structure is reinforced, it is important to consider how social and cultural capital are continuing to play a role in their education. As part of an ongoing project, this summer I crafted a literature review and conducted semi structured interviews with three low-income families. I then began making connections between the literature review and interviews to better understand how cultural and social capital have affected low-income families' experiences with COVID-19 at home schooling.

This experience was funded by: Mellon Mays Undergraduate Fellowship

Live chat from 5:00 - 6:00 p.m.

Larry Donahue

Class Year: 2022

Major(s): Physics

Supervisor(s) and affiliation or institution: Jay Tasson (Assistant Professor of Physics, Carleton College)

Title: *A Search Tool for LIGO Noise Data*

The Laser Interferometer Gravitational-Wave Observatory (LIGO) is an observatory used to collect data on stellar events through the spacetime waves it detects. Unfortunately, gravitational-wave observatories are also sensitive to environmental effects such as seismic and instrumental noise. "Lines" are a data feature consisting of a persistently increased amplitude at a well defined frequency. These features can either be astrophysical signals or be generated by the local environment, and comparisons of the interferometer data with local environment monitors can help distinguish between the two. In this project, we are creating an online tool that will present and store this comparison data for lines appearing in the LIGO signal.

This experience was funded by: LIGO Grant (Physics and Astronomy Department)

Live chat from 4:00 - 5:00 p.m.

Maya Donovan

Class Year: 2023

Major(s): Undecided

Title: *Towards the Ethical Implementation of Shelter In Place Orders*

During the COVID-19 pandemic, there was much public conversation about whether or not shelter in place orders were a good idea because of the extent of the economic damage inflicted by shelter in place orders. The conversation maps well onto academic debates about reciprocity and the use of quarantine as a public health measure. In this paper, the benefits, costs, and reciprocity provided by the government are conceptualized as changes to the capabilities of those living under a shelter in place order rather than as principles that are meaningfully distinguishable from one another. I use Robeyns' framework for specifying the capability approach to develop a list and a decision making process that is well suited to capturing the nuanced impacts of shelter in place order on the daily life of a population. Although the specificity required by the capability approach may pose problems for policymakers who lack a complete understanding of how a shelter in place order may impact a population, I argue that this problem can be accounted for and that by using the capability approach and focusing on well-being one considers the more fundamental question underlying the economic cost vs. health benefit divide and puts policymakers in a better position to make decisions about implementing restrictive public health orders.

This experience was funded by: Dale '60 and Elizabeth Hanson Fellowship in Ethics

Live chat from 5:00 - 6:00 p.m.

Emma Dubinsky

Class Year: 2022

Major(s): Sociology/Anthropology

Title: *My Summer at the SPOT Youth Center, a Youth Health and Social Services Center*

This summer, I worked on three main projects. The first of these was a chart review of youth in foster care at the SPOT. The SPOT provides medical and psychiatric care to youth in foster care through a program called COACH, and I read through client's charts to help assess how the SPOT was doing in regards to psychiatric care. Additionally, I worked on understanding the literature and procedures of other organizations on getting young cis and trans Black women connected to PrEP, a drug to prevent the transmission of HIV. Lastly, I worked on creating and conducting a study to obtain stories about how the pandemic has been affecting Black youth in St. Louis, both medically but also emotionally and financially.

This experience was funded by: Rob White '85 Internship Fund (Career Center)

Live chat from 4:00 - 5:00 p.m.

Danielle Dudley

Class Year: 2021

Major(s): Biology

Supervisor(s) and affiliation or institution: David Zarkower (Professor of Genetics, Cell Biology and Development, University of Minnesota), Vivian Bardwell (Professor of Genetics, Cell Biology and Development, University of Minnesota), Kellie Agrimson (Assistant Professor, St. Catherine University)

Title: *Liver Receptor Homolog 1 (LRH1) is Required in Spermatogonial Stem Cells for Normal Spermatogenesis in the Mouse Testis*

Spermatogenesis is the continuous process by which spermatogonial stem cells (SSC) differentiate into spermatids. Misregulation of the SSC population can result in germ cell depletion and infertility. Liver Receptor Homolog 1 (LRH1), which is expressed in the testis, is an orphan nuclear receptor transcription factor. To evaluate its function, we used a Cre-lox mouse breeding scheme to specifically delete Lrh1 in germ cells. We performed testicular histological analyses and determined a progressive loss of germ cells until approximately six months of age followed by subsequent recovery. Spermatogenesis appeared normal by one year. We hypothesize a compensation mechanism triggers activation of a quiescent reserve SSC pool, perhaps when active stem cell numbers reach a minimum threshold. Preliminary sequencing data suggest, during recovery, Dmrt1 and Dazl are upregulated while Jmjd1c is downregulated in germ cells. Further work will determine whether these transcripts are specific to the SSC population.

This experience was funded by: Kolenkow-Reitz Fund (STEM Board)

Live chat from 5:00 - 6:00 p.m.

Erin Dyke

Class Year: 2021

Major(s): Geology

Title: *SafeZone: Working with Unsheltered Youth During COVID-19*

My internship this summer was as a Youth Advocate Intern at Face to Face SafeZone. COVID-19 has forced Face to Face to make adjustments that were almost antithetical to the purpose of SafeZone: to provide a space in which young, unsheltered and/or at-risk youth could access resources, meet with case managers, have hot meals, and be able to relax in a safe place. Working at SafeZone was emotional, exciting, frustrating, inspiring, and, overall, incredibly meaningful.

This experience was funded by: Project '60 Endowed Internship Fund (Career Center)

Live chat from 4:00 - 5:00 p.m.

Andrew Farias

Class Year: 2021

Major(s): Environmental Studies, Political Science/International Relations

Title: *Green Energy: My Summer as a Northfield Electrification Sustainability Assistant*

In working between the CCCE and the City of Northfield, I learned a great deal about the inner workings of our local Climate Action Plan and the efforts to conserve the environment as it relates to electrification. I spent much of my time researching the wide array of electrical equipment that is available on the market and their sustainability, which offers a unique solution to traditionally gas-powered devices. Ultimately, my summer experience allowed me to gain experience in how the grant process works for large-scale, community projects, identify and research current environmental issues related to electrification, and learn about the marketing materials process for the City of Northfield. I look forward to applying what I learned at my internship to future endeavors in the environmental and political fields at Carleton and beyond.

This experience was funded by: Littell Internship Fund (Career Center)

Live chat from 4:00 - 5:00 p.m.

Andrew Farias

Class Year: 2021

Major(s): Environmental Studies, Political Science/International Relations

Title: *Keeping it Clean: Comparing Environmental Justice Between the Obama and Trump Administrations*

In the twenty-five years that the National Environmental Justice Advisory Council (NEJAC) has counseled the Environmental Protection Agency, the United States has transitioned between four presidents. The most recent change from former Democrat President Barack Obama to current Republican President Donald Trump came with starkly conflicting ideologies and principles in a wide array of public policies. This led me to believe that both presidential administration's responses to environmental justice would likewise be different. As such, I researched the implementation of Obama-era environmental reforms, the status of those policies under the current Trump administration, and their relation to environmental justice. With no congressional legislation explicitly addressing environmental justice, I hold this area of research to be critical to our understanding of future environmental policy decisions relative to traditionally undervalued communities hurt the most.

This experience was funded by: Mellon Graduate School Exploration Fellowship (MGSEF)

Live chat from 5:00 - 6:00 p.m.

Edgar Felix

Class Year: 2021

Major(s): Psychoogy

Title: *Peer Navigators as "Bridges" between Transgender Women and the Health system*

This summer I was able to be a Social Research Intern with Fundacion Huesped, an Argentine organization that since 1989 has been working in public health areas with the mission to develop scientific research and actions for the prevention and promotion of rights to guarantee access to health and reduce the impact of diseases with a focus on HIV / AIDS. By being part of the Fundacion Huesped's team I learned how to work remotely and effectively communicate with others in the workplace. Although meeting remotely had its difficulties, I was able to effectively express myself to the social research team and also learn about them.

This experience was funded by: West Endowed Fund for Service in Developing Countries (Career Center)

Live chat from 5:00 - 6:00 p.m.

Ryan Flanagan

Class Year: 2022

Major(s): Political Science/International Relations

Title: *Exhibit Design/Research Intern, Putnam History Museum*

The Putnam History Museum is an institution dedicated to preserving the rich history of the Hudson Highlands. As an Exhibit Research/Design Intern, I gained hands on experience with public history.

This experience was funded by: The Sam '75 and Meg Woodside (current use) Fund for Career Exploration (Career Center)

Live chat from 4:00 - 5:00 p.m.

Will Fletcher

Class Year: 2021

Major(s): Mathematics, Computer Science

Supervisor(s) and affiliation or institution: Dr. Titus Klinge (Drake University)

Title: *New Insights on Real-Time CRN-Computable Numbers*

The problem we explore concerns real numbers that can be computed robustly. In particular, we explore the subfield $\text{RLCRN} \subseteq \text{RRTC RN}$ of Lyapunov CRN-computable real numbers. These numbers are computed via an exponentially stable equilibrium point and are therefore robust to various perturbations of species concentrations. Huang et al. proved that $\text{Alg} \subseteq \text{RLCRN} \subseteq \text{RRTC RN}$ where Alg is the set of algebraic real numbers. We prove that $\text{Alg} = \text{RLCRN}$, which means that no transcendental number is computable in this robust sense.

This experience was funded by: Dr. Titus Klinge (Drake University); David T.C. Jones '74 Endowed Internship Fund (Career Center)

Live chat from 4:00 - 5:00 p.m.

Aaron Forman

Class Year: 2021

Major(s): History

Supervisor(s) and affiliation or institution: Professor Victoria Morse, Carleton College

Title: *Space and Geography in Boccaccio's Decameron*

This summer, I collaborated with Professor Victoria Morse on a study of boundaries and territory in the fourteenth century collection of short stories known as The Decameron by Giovanni Boccaccio. I primarily worked on an analysis of the Christian-Muslim boundary as it appears across different tales and an ArcGIS story map of Florence for a selection of the stories. In working on the project, I improved my understanding of how to use literary evidence as a historical primary source. In particular, the stories enabled me to explain how Boccaccio perceived Florence and other cities as regions within Italy, and helped define Italy's relation to the rest of the Mediterranean during the fourteenth century.

This experience was funded by: Humanities Center and Dean of the College Office

Live chat from 4:00 - 5:00 p.m.

Aaron Forman

Class Year: 2021

Major(s): History

Title: *CoronaNet Research Project*

This summer, I worked as a Research Assistant on the CoronaNet Research Project. After getting acclimated to the project working on Israel, I began working on the Community of Madrid, Spain, region as well. On August 5, I was promoted to country manager of Spain, giving me project oversight responsibilities in addition to my policy research tasks. During the final weeks of my time on the project, I wrote a country report on Israel, which was published on the CoronaNet website.

This experience was funded by: Career Center Internship Fund

Live chat from 5:00 - 6:00 p.m.

Sophia Franco

Class Year: 2021

Major(s): Political Science/International Relations

Title: GSVlabs

My experience at GSVlabs was incredibly rewarding and enriching. I became comfortable with customer relationship management softwares I had never been exposed to before such as Airtable, Intercom, and Atlassian (specifically Jira and Confluence). I began my internship having never read a pitch deck and left having judged and evaluated well over fifty pitch decks submitted to innovation competitions. As GSVlabs adjusted to virtual events, I learned the ropes of event planning, outreach and live support. I am especially proud of the work I did on the marketing team where I got to apply my writing skills and storytelling abilities to promote GSVlabs as an enterprise. This internship was a riveting crash course in business, innovation and startup culture, and I feel lucky to have worked with such a fantastic team of professionals.

This experience was funded by: Robert E. Will '50 Endowed Internship Fund in Social Entrepreneurship (Career Center)

Live chat from 5:00 - 6:00 p.m.

Kyle Fraser-Mines

Class Year: 2021

Major(s): Physics

Supervisor(s) and affiliation or institution: Cindy Blaha (Professor of Physics and Astronomy, Carleton College)

Title: *New method of imagery more effectively reveals the evolutionary history of Local Group Galaxies*

Understanding the make up of the universe and how it has evolved over time has been of great interest to astronomers over time. We aimed to understand the evolutionary history of Local Group Galaxies using H-alpha, [OIII], and [SII] emission line images. We used these images we create a colored, stacked emission line image to more effectively display the ratios of elements in the galaxies. The mixtures of colors in the stacked images revealed various structures, including star forming regions, supernova remnants, and planetary nebulae, in the Local Group Galaxies. This new method of imagery will help to reveal further insights about the evolutionary history of other galaxies.

This experience was funded by: Minnesota Space Grant Consortium (Physics and Astronomy Department)

Live chat from 4:00 - 5:00 p.m.

Ricardo Garcia

Class Year: 2021

Major(s): Sociology/Anthropology

Title: *Action in Montgomery: A Summer of Virtual Organizing in Maryland*

This summer I was able to learn the tools of relational organizing, which I was able to master through working with community members to discuss issues impacting their community such as, but not limited to, healthcare, housing, and educational reform. Additionally, took part of multiple virtual meetings with elected government officials to help AIM move forward with the issues affecting the community.

This experience was funded by: Social Justice Internship (Chaplain's Office)

Live chat from 5:00 - 6:00 p.m.

Will Gleason

Class Year: 2021

Major(s): French and Francophone Studies

Title: *Narrating Colonial Death into National Adventure: the Explorer and the French Press in the 19th Century.*

The romantic image of a rugged adventurer braving the "unknown" pervades the colonial unconscious. In the 19th century, the explorer Pierre Savorgnan de Brazza (1852 – 1905) and his entourage were the "heroes" of French colonial adventure. In my research, I used Brazza's personal correspondence, his coverage in the press, and word frequency data

to analyze the narration and emplotment of Brazza's colonizing expeditions in central Africa. I found the construction of myth: a call to action in a lost war, a villain in a rival explorer, and dangerous trials throughout. I found that through the hero and his adventure, the empire veils destruction and death in trials and heroics.

This experience was funded by: Center for Global and Regional Studies

Live chat from 4:00 - 5:00 p.m.

Sarah Grier

Class Year: 2021

Major(s): Economics, Statistics

Title: *Internship Reflection: Office of Congressman Eric Swalwell*

This summer, I had the privilege of working as a Congressional Intern for Congressman Eric Swalwell's Washington DC office. Growing up, I was obsessed with American history, politics, and Washington DC. I would often daydream about what it would be like to work on Capitol Hill. To nobody's surprise, the COVID-19 pandemic this summer made things look a little bit different than they did in my congressional daydreams. However, the experiences I have been able to have this summer opened up opportunities that would not have been possible in a "normal" summer and allowed me to learn firsthand what goes into working in a congressional office, as well as learn a lot about myself and my future career goals.

This experience was funded by: Jean Phillips Memorial Internship Fund (Career Center)

Live chat from 5:00 - 6:00 p.m.

Anna Grove

Class Year: 2021

Major(s): Linguistics

Other Authors/Contributors: Kristin Miyagi, Rebecca Margolis, and Anna Shumacher

Title: *Wrestling with the Truth of Colonization and its Aftermath*

This summer, I held a remote summer internship with Industrial Areas Foundation - Northwest, a community organizing nonprofit based in Seattle, WA. I split my time between working for the Regional Organizer, Joe Chrastil ('78) and the Lead Organizer of a member organization called Metropolitan Alliance for the Common Good, Mary Nemmers. With Joe, I worked with three other Carleton interns to develop a 10-hour decolonization workshop centering Indigenous experiences with colonization in New Zealand, Australia, Canada, and the United States. With Mary, I assisted in organizing the climate action and strategy teams, as well as helped to build the antiracism action team and served on its learning resources subcommittee. I also learned to conduct relational meetings effectively. Through my summer internship, I achieved my goals of deepening skills in leadership and collaboration, while also exploring the field of community organizing in social and environmental justice.

This experience was funded by: Social Justice Internship (Chaplain's Office)

Live chat from 4:00 - 5:00 p.m.

Claire Guang

Class Year: 2021

Major(s): Psychology

Supervisor(s) and affiliation or institution: Julia Strand (Professor of Psychology, Carleton College)

Title: *Recall of Speech is Impaired by Subsequent Masking Noise: A Direct Replication of Rabbitt (1968)*

Understanding speech in noise is a cognitively demanding task that results in increased "listening effort"—the cognitive resources necessary to understand speech. Given that humans have a limited pool of cognitive resources, as listening effort increases, fewer resources should be available to rehearse and encode speech. Therefore, greater listening effort

leads to poorer recall of what was heard. The first study on listening effort (Rabbitt, 1968), found poorer recall for the first-half lists of spoken numbers when the second half-list was presented in background noise than when presented without. However, the study has never been directly replicated. Here, we conducted a direct replication using multiple analytical and scoring techniques. Rabbitt's original findings replicated when we mirrored the design and analysis, and when we updated the analysis to reflect modern statistical advancements.

This experience was funded by: National Institutes of Health (Julia Strand)

Live chat from 5:00 - 6:00 p.m.

Ziyun Guang

Class Year: 2023

Major(s): Undecided

Title: *Cell Line Development Process of GS Knocked Out CHO Cells for Monoclonal Antibodies Production*

Chinese hamster ovary (CHO) cells are an epithelial cell line derived from the ovary of the Chinese hamster, the most common mammalian cell line used in manufacture of therapeutic proteins. We performed basic lab works within CHO cell line development, including cell thawing, transfection, methionine sulfoximine (MSX) selection, single cell cloning, titer screening, fed-batch culture, and cell freezing.

This experience was funded by:

Live chat from 4:00 - 5:00 p.m.

Ivan Gunther

Class Year: 2021

Major(s): Physics

Supervisor(s) and affiliation or institution: Arjendu Pattanayak, Carleton College; Andres Aragonese, Eastern Washington University

Title: *Characterizing Powers of Words in the Duffing Oscillator*

Ordinal Patterns are a type of data analysis tool, whose definition is physically unintuitive, and which as of yet has had few clear advantages over more common measures like Lyapunov Exponents and Poincare Sections. Ordinal Patterns store strictly more information than Lyapunov Exponents, which sometimes allows them to predict nearby stability in chaotic parameter spaces. Using the Duffing Oscillator as our medium, we illustrate the acute sensitivity of Ordinal Patterns to chaos-stability shifts, allowing us to detect a new type of temporal structure parallel to chaos and stability, and predict regime changes across parameter space with greater effectiveness than other, similar data analysis tools.

This experience was funded by: Towsley Endowment for the Sciences (STEM Board)

Live chat from 5:00 - 6:00 p.m.

Anna Gwin

Class Year: 2022

Major(s): Political Science/International Relations

Title: *Integral Values and Immigration Policy: Comparing French & U.S. Systems*

I interned with the French Office of Immigration and Integration (OFII) to conduct research on the differences between the United States and French immigration systems, where these differences come from in terms of national history, and the effects these differences have on the immigration experience today. I specifically focused on the civic values these systems seek to impart to immigrants. Several values are prioritized in both states - liberty and equality - but the definitions carry different nuances in the U.S. and in France. Other values, like opportunity for the U.S., and laïcité for the French, can be even harder to define. However, because public systems are based around these values, defining them is valuable to assessing the impact they have on immigration.

This experience was funded by: Jean Phillips Memorial Internship (Career Center); Post-Paris Internship (Center for Global and Regional Studies)

Live chat from 4:00 - 5:00 p.m.

Isabel Hackett

Class Year: 2021

Major(s): History

Title: *Settlement in the Bahamas: A Digital and Public History Project*

I spent the summer of 2020 working with a professional historian/anthropologist who owns a private consulting business dedicated to archaeological and historical surveys. For several years, my internship supervisor has been engaged in a research project using original land grants and other primary source material to better understand migration and settlement patterns on Long Island in the Bahamas. My job was to find a user-friendly way to showcase her research, so I built a website that allows people to learn about the settlement of the Island. By designing a website and populating the pages for the different types of content, I helped my supervisor tell her story in an accessible way. This internship allowed me to take the skills I've developed doing history at Carleton and apply them to the field of public history, showing me a hands-on way to use history.

This experience was funded by: Elizabeth and George Frost Endowed Internship Fund (Career Center)

Live chat from 5:00 - 6:00 p.m.

Emily Shir Hall

Class Year: 2021

Major(s): Biology

Title: *Surveying Rice County Community Members on Desired Food Access Models*

This summer I worked as an intern with the Healthy Community Initiative, focusing on its program Growing Up Healthy. GUH strives to support the diverse Rice County community by cultivating neighborhood leadership, fostering social connectedness, and collectively advocating for systems-level change. One project GUH prioritized this summer aimed to improve the efficiency of Faribault food distribution systems to better address gaps in food access prevalent in specific communities such as the Somali refugee population, the Latinx population, and school-aged children. My co-intern and I researched successful food distribution systems, surveyed Rice County residents on their preferred models, and analyzed the data we collected. We then translated and organized the findings, and presented them to the GUH team and community partners to help guide the new initiative toward a community-desired model. In order to better understand the existing food access systems in the community, we volunteered with the GUH team to distribute food in Faribault and Northfield.

This experience was funded by: Weitz Family Foundation Gift (Center for Community and Civic Engagement)

Live chat from 4:00 - 5:00 p.m.

Wenlai Han

Class Year: 2023

Major(s): Undecided

Other Authors/Contributors:

Supervisor(s) and affiliation or institution: Professor Matt Whited (Associate Professor of Chemistry, Carleton College)

Title: *Synthesis of a Series of Pincer-Type Group 9 Transition Metal Silyl Complexes*

Past studies from our group have shown that complexes featuring cobalt-silicon bonds may have significant catalytic value. We aim to expand this relatively stable pincer structure onto the other elements down the group-9 transition

metal column in order to further investigate structure/function relationships and potential in catalysis. Here we report preliminary findings toward synthesis of silyl ($M-SiR_3$) and silylene ($M=SiR_2$) complexes of rhodium and iridium, supported by phosphine co-ligands with phenyl or cyclohexyl substituents in order to explore reactivity changes. We have crystallographically characterized one new cobalt silyl complex, and we report progress toward preparation of Rh and Ir analogues.

This experience was funded by: National Science Foundation CAREER Award (Matt Whited)

Live chat from 5:00 - 6:00 p.m.

Vincent He

Class Year: 2022

Major(s): Physics

Supervisor(s) and affiliation or institution: Jay Tasson (Assistant Professor of Physics, Carleton College)

Title: *Tests of Lorentz Symmetry from Speed of Gravity Measurements*

Gravitational waves are ripples in spacetime that are gravity's analogue of the electromagnetic waves that form light. Lorentz symmetry, which describes the symmetry of spacetime, is a foundational assumption on which General Relativity, our current best theory of gravity, is constructed. One potential consequence of Lorentz violation is a speed of gravitational waves that differs from light. We can test for Lorentz symmetry violations, as described by the Standard-Model Extension (SME) test framework, using speed of gravity measurements from laser- interferometer gravitational wave detectors. Using Markov chain Monte Carlo methods, we simultaneously constrain multiple terms in the SME framework with speed of gravity measurements for the first time. This method can also be extended to test for dispersion and birefringence of gravitational waves.

This experience was funded by: LIGO Grant (Physics and Astronomy Department)

Live chat from 4:00 - 5:00 p.m.

Claudia Hernandez Barrientos

Class Year: 2021

Major(s): Latin American Studies

Supervisor(s) and affiliation or institution: Constanza Ocampo-Raeder (Professor of Anthropology, Carleton College)

Title: *Latinos in the Midwest: Identity and Community Formation*

The media often develops commonalities among strangers, but it can also perpetuate stereotypes that lead to the exploitation and discrimination of certain ethnic groups. In my research, I explore the role of media in othering Latinos and in promoting concepts of nation and belonging as points of friction between communities, specifically in the rural Midwest. Conflict occurs between the Latino and Anglo communities when Latinos maintain a strong connection with the culture and traditions of their country of origin rather than assimilating into the established customs and norms of the region. This tension can lead to the formation of cultural enclaves and further isolate each community from one another. To challenge the negative stereotypes of Latinos and bridge this cultural gap, the media must be flooded with new images that show the complexities, differences, and beauty of diverse Latino cultures.

This experience was funded by: Mellon Mays Undergraduate Fellowship

Live chat from 5:00 - 6:00 p.m.

Rebecca Hicke

Class Year: 2022

Major(s): Computer Science

Other Authors/Contributors: Maanya Goenka

Supervisor(s) and affiliation or institution: Professor Eric Alexander (Assistant Professor of Computer Science)

Title: *Word Clouds in the Wild*

Word clouds are often seen in the visualization community as untrustworthy and many researchers doubt that they effectively communicate information to viewers. Despite this, they still appear to be widely used in academia. Previous studies have looked at how changes in particular data encoding channels affect a viewer's interpretation of word clouds, yet little research has been done on how they are currently being used. We have performed a survey of word clouds in Digital Humanities academia and found several interesting results that will help guide future research. Among these results was the fact that a notable proportion (around $\frac{1}{3}$) of word clouds vary the color of words for aesthetic purposes and that there is a correlation ($p = 0.000033$, $\alpha = 0.05$) between the purpose of a cloud and the lower-level tasks the user is asked to perform with it. Significantly, our survey highlights the need for further study on the uses and effectiveness of word clouds, given their prevalent use--both appropriate and inappropriate--in academic sources since the late 2000s.

This experience was funded by: Professor Eric Alexander (Assistant Professor of Computer Science) Carleton Dean's Office Funding

Live chat from 4:00 - 5:00 p.m.

Maya Hilty

Class Year: 2021

Major(s): Environmental Studies

Title: *Exploring Local Environmental Solutions: Case Studies of Water Clean-up and Behavioral Change*

I completed two remote research projects with the Cannon River Watershed Partnership. I first compiled case studies of how communities across the U.S. – and, in particular, communities with land use regimes similar to Northfield, Minnesota – have made significant progress toward cleaning up polluted waterways. Most case studies outline water restoration efforts in the Midwest, especially in Minnesota, Wisconsin, Iowa, and Michigan, with a few exceptions for case studies across the United States that involved pioneering regulatory fixes to nonpoint source pollution. For my second project, I compiled varied examples of how certain groups of people (including government entities, businesses, and nonprofit organizations) in the United States have been able to promote a desirable behavior change among another target group of people, and categorized my findings by the type of solution implemented.

This experience was funded by: Littell Internship Fund (Career Center)

Live chat from 4:00 - 5:00 p.m.

Alison Hong

Class Year: 2022

Major(s): Cinema and Media Studies, French and Francophone Studies

Title: *Cultural Institutions in the Age of Crisis - the US and France*

I was doing research for the last bookstore specialized in cinema in Paris. As the digital age came, many traditional cultural institutions were crushed, and online shopping has become the major way for most of the consumers in the 21st century. However, there are still some traditional business that stays and survives. The pandemic in 2020 pushes more insitutions out of the business. What are they doing during the age of crisis? What do they think of this gradually dwindling industry?

This experience was funded by: Abeona Endowed Fund for International Internships; Post-Paris Internship (Center for Global and Regional Studies)

Live chat from 5:00 - 6:00 p.m.

Anna Hughes

Class Year: 2021

Major(s): Chemistry

Other Authors/Contributors:

Supervisor(s) and affiliation or institution: Dr. Yui Takeshita, scientist at the Monterey Bay Aquarium Research Institute (Carleton alum, '08).

Title: *Characterizing changes in upwelling dynamics under anthropogenic climate change with Spray underwater gliders*

The nearshore waters of the California Current System (CCS) are particularly vulnerable to anthropogenic ocean acidification due to the seasonal upwelling of carbon-rich waters. Anthropogenic carbon emissions have led to an observed decrease in ocean pH from the preindustrial era. Ocean acidification, coupled with increasing temperature and hypoxia, is projected to have negative consequences for the diverse ecosystems that inhabit these waters, particularly the waters of Monterey Bay, located in Central California. Gliders are autonomous underwater vehicles that collect data through conducting profiling dives. Here we show how Spray underwater gliders, suited with pH and oxygen sensors, can capture the high interannual and interseasonal variability of these waters. Additionally, we use glider observations to estimate the anthropogenic carbon signal in the waters near Monterey Bay. Gliders provide the high-spatiotemporal observations necessary to track these processes, in order to better understand the negative impacts on the marine ecosystems in the CCS.

This experience was funded by: Kolenkow-Reitz Fund (STEM Board)

Live chat from 4:00 - 5:00 p.m.

Trevor Hughes

Class Year: 2021

Major(s): Cognitive Science

Title: *Educating and Advocating on Behalf of Those Affected by Partner-Inflicted Brain Injuries*

For every NFL player that experiences a concussion, over 13,000 American women suffer the same injury. While often not discussed by the media, many victims of intimate partner violence sustain brain injuries via blows to the head and/or neck region. Learn more about recognizing, understanding, and advocating on behalf of those affected by partner inflicted brain injuries.

This experience was funded by: Trace McCreary '89 and Alissa Reiner Endowed Internship Fund (Career Center)

Live chat from 5:00 - 6:00 p.m.

Adam Ickler

Class Year: 2022

Major(s): Physics

Supervisor(s) and affiliation or institution: Ryan Terrien (Assistant Professor of Physics and Astronomy)

Title: *Measuring Depths of Metal Features in M Type Stars with the Habitable Zone Planet Finder*

In the search for exoplanets, M type stars are of particular interest due to the relative ease of detecting habitable exoplanets orbiting them. To determine the makeup of these planets it is useful to know the makeup of the star they orbit. The typical method for determining the abundance of metals in a star is to measure the depth of absorption lines in its spectrum. M type stars present a unique challenge because of their relative dimness. I compiled potentially useful features from theoretical and empirical sources, then narrowed this list using spectra from the Habitable Zone Planet Finder to those that remain consistent over time. Measuring the depths of these features I found four with a correlation to previously measured metal abundances. Moving forward, this process could be used to establish an empirical method for measuring metal abundance and other properties, such as magnetic activity, in M type stars.

This experience was funded by: Towsley Endowment for the Sciences (STEM Board)

Live chat from 4:00 - 5:00 p.m.

Emma Ismail

Class Year: 2021

Major(s): Linguistics

Supervisor(s) and affiliation or institution: Catherine Fortin (Associate Professor of Linguistics, Carleton College)

Title: *An Investigation of Indonesian Comparative Constructions and Corpora*

The main part of my project this summer investigated the syntactic structure of Indonesian comparatives (e.g. Charlie is taller than Lucy). By using predictions from work on related languages and gathering data from a native speaker, we were able to start testing the grammaticality of different syntactic structures. The second project was an initial investigation into the available corpus materials for Indonesian. Corpora research is a rapidly growing subset of linguistic research and by doing a primary investigation of the state of the corpus research in Indonesian I was able to lay the groundwork for a future project.

This experience was funded by: Humanities Center

Live chat from 5:00 - 6:00 p.m.

Erin Jenson

Class Year: 2021

Major(s): Biology

Title: *Conserved Helix in Nuf2 Suggests a Function in Kinetochores-Microtubule Attachments*

When cells divide, they go through a process called chromosome segregation to ensure that each daughter cell receives a copy of DNA. During chromosome segregation, the Ndc80 complex attaches to the microtubule to facilitate the separation of the sister chromatids. Ndc80, a protein in the complex, is known to directly bind microtubules. Nuf2, another Ndc80 complex protein, plays a role in this process but does not directly attach to microtubules, and the exact mechanism for this process is still unknown. We used Jalview and Chimera to align Nuf2's genetic sequence for various species and create a conservation map. We found that Nuf2's α G helix is extremely conserved across fungal species, with some residues conserved across metazoans. This suggests that it serves an important function in chromosome segregation. We propose an auto-inhibition mechanism in which the loop covering Nuf2's α G helix is expelled and leaves the helix free for binding microtubules.

This experience was funded by: Eugster Endowed Research and Internship Fund (Career Center)

Live chat from 4:00 - 5:00 p.m.

Felipe Jimenez

Class Year: 2021

Major(s): English

Title: *Grey Matter Editorial Internship*

In my poster I will outline what Grey Matter is; what their mission is, what they're trying to solve in the music industry, and talk about what it was like to work for a social media start up that aimed to build community through music sharing. I will also clearly explain my different tasks, such as online marketing, community outreach, user feedback, and research on different venture capitalist firms, as well as sharing music and learning more about the independent music world. Overall, I will give an impression of what it was like to work remotely for a budding start up and clearly explain what my thoughts on the internship were once it was completed.

This experience was funded by: Robert E. Will '50 Endowed Internship Fund in Social Entrepreneurship (Career Center)

Live chat from 5:00 - 6:00 p.m.

Helen Jin-Lee

Class Year: 2023

Major(s): Undecided

Supervisor(s) and affiliation or institution: Dr. Benjamin T. Himes (Mayo Clinic), Dr. Ian F. Parney (Mayo Clinic)

Title: *The Role of Macrophage Migration Inhibitory Factor in Glioblastoma-Mediated Induction of Myeloid-Derived Suppressor Cells*

Glioblastoma multiforme (GBM), the deadliest type of brain tumor, can suppress the immune system via extracellular vesicles (EVs) that carry immunosuppressive proteins. One of the proteins (Macrophage Migration Inhibitory Factor, MIF) found in GBM has been linked to the induction of immunosuppressive monocytes (myeloid-derived suppressor cells, MDSCs). These immunosuppressive monocytes play a critical role in the suppression of other immune cells. Therefore, understanding the mechanism of MDSC induction can help in developing more effective immunotherapies. This experiment used a doxycycline (Dox) inducible knockout system to examine the role of MIF in the induction of immunosuppressive monocytes. Monocytes from healthy donors were isolated and co-cultured with GBM-derived EVs under hypoxia, and the percentage of immunosuppressive monocytes was quantified using flow cytometry. The results showed that MIF does not seem to be associated with MDSC induction, but more investigation is recommended.

This experience was funded by: Mayo Clinic

Live chat from 4:00 - 5:00 p.m.

Jack Johnson

Class Year: 2021

Major(s): Economics, Political Science/International Relations

Other Authors/Contributors: Izzy Link

Title: *Food Access at the Northfield CAC Foodshelf*

This summer we helped the Northfield Community Action Center function as Food Access Fellows. Nearly 400 families and individuals in Northfield, MN experience some level of food insecurity. In our roles we helped those people have easier access to food by making the foodshelf more welcoming with healthier more enjoyable food and facilitating offsite food giveaways for the general public.

This experience was funded by: Weitz Family Foundation Gift (Center for Community and Civic Engagement)

Live chat from 5:00 - 6:00 p.m.

Anika Jones

Class Year: 2023

Major(s): Undecided

Title: *Interning at Action in Montgomery*

Over the summer, I interned at Action in Montgomery in Montgomery County, MD. Action in Montgomery is a community organizing institution that helps local communities campaign for issues relevant to them. During this internship, I wrote leader profiles for their upcoming fundraising campaign, sat in on meetings, and did research for potential future campaigns.

This experience was funded by: Social Justice Internship (Chaplain's Office)

Live chat from 4:00 - 5:00 p.m.

Sydney Marie Jones

Class Year: 2022

Major(s): Biology

Title: *Science Communications Internship with the Southern Research Station*

I worked as a science communications intern for the Southern Research Station, an organization under the U.S. Forest Service umbrella. I interviewed scientists about recent ecological research in the region and wrote articles for the station's online magazine, CompassLive.

This experience was funded by: Littell Internship Fund (Career Center)

Live chat from 5:00 - 6:00 p.m.

Marcella Jurotich

Class Year: 2021

Major(s): Linguistics, German

Other Authors/Contributors: Anna Grove

Supervisor(s) and affiliation or institution: Cherlon Ussery (Professor of Linguistics, Carleton College)

Title: *Ditransitives in Insular Scandinavian*

The goal of this project is to investigate ditransitive verbs in Icelandic and Faroese. The project addresses three research questions that examine the relationship between case and sentence structure. First, we designed a survey in English, Icelandic, and Faroese to determine the underlying structures of different types of ditransitives. Second, we seek to determine if these structures are independently generated or if one is derived from the other. Finally, we examine the process of inversion and its interaction with ditransitive structures in Icelandic and Faroese. In preparing for future rounds of the project, we are researching aspect and scope.

This experience was funded by: Cherlon Ussery (Professor of Linguistics, Carleton College) Humanities Center SRP

Live chat from 5:00 - 6:00 p.m.

Nina Kaushikkar

Class Year: 2022

Major(s): Political Science/International Relations, English

Other Authors/Contributors:

Supervisor(s) and affiliation or institution: Summer Forester (Assistant Professor of Political Science, Carleton College), Arnab Chakladar (Associate Professor of English, Carleton College), Lori Pearson (Professor of Religion, Carleton College), Cathy Yandell (W. I. and Hulda F. Daniell Professor of French and Francophone Studies)

Title: *Situating Trauma Following Civil Wars in Liberia and Sierra Leone*

Fully understanding the traumas of civil war requires a multilayered approach that reaches beyond the current male-dominated, Eurocentric model and a deeper interrogation of the way trauma complicates notions of truth and memory. Using the Liberian and Sierra Leonean civil wars, this project takes an intersectional approach, incorporating decolonial and gendered lenses, to recognize the nuances of different forms of trauma inflicted by actors with complex identities. From these varied experiences, separate truths are created due to the divergence of individuals' memories from the "real" series of events. Truth and reconciliation commissions (TRCs) have been one method for individuals and communities to express and heal from these conflicting versions of truth. However, I argue that TRCs, while somewhat effective in reforming societal relations, fall short in addressing trauma on an individual level - a gap that can perhaps be remedied with literary and performative art.

This experience was funded by: Mellon Mays Undergraduate Fellowship

Live chat from 4:00 - 5:00 p.m.

Ally Keen

Class Year: 2022

Major(s): Physics

Supervisor(s) and affiliation or institution: Ryan Terrien (Assistant Professor of Physics and Astronomy, Carleton College)

Title: *Individualizing the Cross-Correlation Projected Rotational Velocity Method for M-Dwarf Stars Improves Stability*

Stellar rotational velocities reflect important stellar properties including the age and activity of the star and detectability of an orbiting exoplanet. By measuring broadened spectral lines, we find the projected stellar rotational velocity, $v_{\text{sin}i}$. One method to measure $v_{\text{sin}i}$ cross-correlates a stellar spectrum with a template spectral mask, resulting in a cross-correlation function (CCF). We calculate $v_{\text{sin}i}$ from the width of this function's peak. However, the stability of this method applied to M-dwarf spectra observed by the Habitable-Zone Planet Finder (HPF) spectrograph is largely untested. We improve this cross-correlation technique through alterations in the masks and to the stellar spectra that serve as our templates across the M-type range. We find by tailoring masks to features in the spectral type range and increasing the signal-to-noise in the calibration spectra the CCFs approach the expected Gaussian curve. The adjusted CCF algorithm increases the stability, producing more precise and reliable outputs.

This experience was funded by: Minnesota Space Grant Consortium (Physics and Astronomy Department)

Live chat from 5:00 - 6:00 p.m.

Jenna Korobova

Class Year: 2021

Major(s): Statistics

Supervisor(s) and affiliation or institution: Adam Loy (Assistant Professor of Statistics, Carleton College)

Title: *Bootstrapping LMEs, Revisited: Updating the lmeresampler R Package*

Linear mixed-effects models (LMEs) are models that fit data with an underlying hierarchical structure, accounting for the dependent nature of such clustered data. The R package, "lmeresampler" provides functionality to perform various bootstrap processes for LMEs, including the parametric, residual, cases, CGR, and REB bootstraps. This is particularly useful for models fit with relatively small data sets, where bootstrapping may yield more robust parameter estimates. The purpose of this research project was to update the package to include additional functionality, to create a hex sticker logo, and to write a package vignette. The updated "lmeresampler", version 0.2.0, includes new user functions, parallelization options, and overall improved runtime of bootstrap processes.

This experience was funded by: Towsley Endowment for the Sciences (STEM Board)

Live chat from 4:00 - 5:00 p.m.

Eve Kortanek

Class Year: 2022

Major(s): Psychology

Supervisor(s) and affiliation or institution: Dr. Shafali Jeste (UCLA Center for Autism Research and Treatment)

Title: *Early Developmental Concerns in 22q11.2 Deletion and Duplication Carriers*

22q11.2 deletions and duplications are among the most common copy number variations (CNVs) associated with neurodevelopmental disorders. Although these CNVs are often diagnosed early in development, few studies have examined their early developmental features. Aiming to facilitate early intervention and improve developmental outcomes in 22q11.2 CNV carriers, as well as inform prospective investigations of neurodevelopmental disorders such as Autism Spectrum Disorder, we evaluated aspects of motor, social, and cognitive development in 22q11.2 deletion (N = 63) and duplication (N = 30) carriers age 5 and under via standardized caregiver questionnaires. The majority (>85%) of caregivers reported developmental concerns, with a high proportion (>60%) reporting social communication concerns as well as global developmental concerns. Proportions of reported concern were similar between 22q11.2 deletion and duplication carriers, with the exception of global concerns [$\chi^2(1, N = 93) = 5.3, p = .021$] and gross motor concerns [$\chi^2(1, N = 93) = 9.2, p = .0024$] reported more prevalently in 22q11.2 duplications. These findings suggest the need for developmental monitoring in 22q11.2 CNV carriers to initiate early interventions.

This experience was funded by: Kolenkow-Reitz Fund (STEM Board)

Live chat from 5:00 - 6:00 p.m.

Alex Kucich

Class Year: 2021

Major(s): Sociology/Anthropology

Title: *Summer Internship: Growing Up Healthy*

This summer I worked with Growing Up Healthy (GUH), a social service organization affiliated with the Northfield Healthy Community Initiative that works to connect Spanish-speaking communities in Rice County with educational, community-building, and health services. This summer, GUH focused almost exclusively on food access work, desperately needed in Rice County due to the economic impacts of COVID-19. My job at GUH included two main components: mobile food distribution, and food access research. Working with mobile food distribution in Faribault allowed me to interact directly with community members, talking with them and passing out boxes of free food. The research component of my work involved writing and analyzing surveys (in English, Spanish and Somali), organizing focus group listening sessions, and interviewing leaders from other successful food access organizations around Minnesota, to better prepare GUH in its planning of a new food pantry in Faribault.

This experience was funded by: Weitz Family Foundation Gift (Center for Civic and Community Engagement)

Live chat from 4:00 - 5:00 p.m.

Maddie Kyhl

Class Year: 2021

Major(s): Statistics

Title: *Process Intern at 1871*

I worked on a journey mapping project at the tech incubator located in Chicago, 1871.

This experience was funded by: Robert E. Will '50 Endowed Internship Fund in Social Entrepreneurship (Career Center)

Live chat from 5:00 - 6:00 p.m.

Nghi Lam

Class Year: 2022

Major(s): Biology

Supervisor(s) and affiliation or institution: Nicole Kettner (Post-doctoral fellow MD Anderson Cancer Center)

Title: *Role of IL-6 in Promoting Palbociclib Resistance in Estrogen Receptor Positive Breast Cancer*

Clinically, the combination of CDK4/6 inhibitors i.e. palbociclib with endocrine therapy has doubled progression free survival for advanced ER+ breast cancer patients (Finn et al., 2016). However, most patients eventually develop resistance and there remains an urgent need to find new therapeutic options for these patients. Data from our pre-clinical palbociclib-resistant models suggested the upregulation of the IL-6/STAT3 signaling pathway promotes palbociclib resistance (Kettner et al., 2019). We hypothesize prolonged palbociclib-induced senescence leads to sustained IL-6 induction causing the reprogramming of the cells into a resistant phenotype. Data from IL-6-knockdown resistant cells suggested that inhibition of the IL-6/STAT3 signaling by IL-6 knockdown resensitizes palbociclib-resistant cancer cells (MCF7 and T47D) to palbociclib. We also generate a senescence-associated phenotype signature to be used as markers of resistance in resistant cells and patient plasma samples.

This experience was funded by: CPRIT Research Training Program at MD Anderson Cancer Center

Live chat from 4:00 - 5:00 p.m.

Olivia Laub

Class Year: 2021

Major(s): Geology

Supervisor(s) and affiliation or institution: Dr. Kristin Bergmann (EAPS, MIT); Clint Cowan (Professor of Geology, Carleton College)

Title: *Reconstructing Devonian Paleotemperature Using a Compilation of Bulk Rock Stable Oxygen Isotopes*

To improve our understanding of past climates, a detailed paleotemperature record is necessary. Unfortunately, the paleotemperature record of the early Paleozoic is poorly constrained due to the sparsity of well-preserved fossils used for oxygen isotope paleothermometry, the preferred temperature proxy for ancient climates. Although bulk rock carbonates are considered more susceptible to alteration, they allow for greater spatial and temporal coverage in the Paleozoic. Given evidence that despite post-depositional alteration carbonates experience relatively little change to their bulk oxygen isotopic composition, we compiled bulk rock oxygen isotope data from Devonian strata to develop a higher-resolution paleotemperature record. After amassing data from nine globally distributed regions, we aligned the records using biostratigraphic age models and compared our bulk-rock record to a previously compiled brachiopod record. We found that our bulk-rock oxygen isotope trends are in agreement with that of the brachiopod record while covering a greater temporal resolution.

This experience was funded by: Kolenkow-Reitz Fund (STEM Board)

Live chat from 5:00 - 6:00 p.m.

Stephen Lavey

Class Year: 2022

Major(s): Chemistry

Supervisor(s) and affiliation or institution: Dr. Erik Munson (Marquette University)

Title: *Regional Surveillance of Antimicrobial Resistance in Clinically-Significant Bacteria*

Susceptibility testing on bacterial samples from across the state of Wisconsin was performed to better understand regional trends of antimicrobial resistance. Each bacterial sample underwent a four day testing procedure, including plating the sample, sub-plating onto blood agar, setting up the susceptibility test, and reading the test. In addition to susceptibility testing, I was able to partake in SARS-CoV-2 testing through transcription-mediated amplification (TMA) as well as research trends in mycoplasma genitalium antibiotic resistance from a dataset of college students.

This experience was funded by: Dr. Erik Munson (Marquette University); Eugster Endowed Fund for Research and Internships (Career Center)

Live chat from 4:00 - 5:00 p.m.

Nhan Le

Class Year: 2021

Major(s): Geology

Title: *Reconstructions of the Yakutat Terrane Movement during the Cenozoic using GPlates*

Alaska is made up of many allochthonous terranes that collided with and accreted to North America throughout the Cenozoic. The Yakutat terrane is a microplate that formed ~53 Ma as an oceanic plateau most likely along the Kula-Farallon ridge to the south and is currently colliding with North America in Southern Alaska. Previously published plate tectonic reconstructions place the Yakutat terrane near present day Washington, or as far south as California during the Eocene. For this study, GPlates, an open-source interactive plate reconstruction program, was used to test various reconstructions of the Yakutat movement history by comparing geologic evidence (e.g. detrital zircon facies) between

the Yakutat terrane and the North American margin to the south. Preliminary results suggest that the Yakutat terrane formed adjacent to the Western Mélange Belt in Washington, and that the older parts of the Yakutat terrane may have formed as far south as Southern California.

This experience was funded by: National Science Foundation S-STEM (Summer Science Fellows)

Live chat from 5:00 - 6:00 p.m.

Marcella Lees

Class Year: 2021

Major(s): History

Other Authors/Contributors: Hannah Zhukovsky

Title: *Public History Intern*

We worked on a number of public history projects for Carleton College and the surrounding area working especially with the Rice County Historical Society, the Minnesota School for the Blind, and the Carleton Covid-19 archive. We both worked on a project for the MSAB helping to secure a grant to digitize a set of class photos spanning back over the past 80 years. We also processed these photos and collected all the necessary metadata. Hannah also worked on processing a set of photos for the RCHS as well as some archival work and Marcella worked on curating an exhibit for the Covid-19 archive and doing data organization for the MSAB.

This experience was funded by: CCCE

Live chat from 4:00 - 5:00 p.m.

Grace Leuchtenberger

Class Year: 2021

Major(s): Biology

Title: *Mussel Workout: The effects of different regimens of temperature fluctuation on bay mussel respiration*

Ocean warming poses a threat to marine organisms around the world. These effects are especially evident on intertidal shores that can experience dramatic temperature fluctuation (+/-15C on a daily basis). Previous modelling work suggests that thermal variation can impact ecophysiological performance as significantly as changes in mean temperature. Nevertheless, thermal stress experiments typically use constant temperatures or oversimplified "block" temperature fluctuations between a minimum and maximum temperature. I used actual water temperatures sampled every 1-5 min from a submerged mussel bed to parameterize lab experiments measuring respiration rates in mussels. Although mussels exposed to field temperatures had slightly higher or lower respiration rates than those in the "block" treatment depending on the treatment's maximum temperature, these differences were not significant. Respiration rates did, however, vary with water temperatures at the collection site, demonstrating the importance of acclimation in ecophysiology experiments.

This experience was funded by: National Science Foundation (Mike Nishizaki)

Live chat from 4:00 - 5:00 p.m.

Anna Li

Class Year: 2021

Major(s): Psychology

Other Authors/Contributors: Will Altaweel

Supervisor(s) and affiliation or institution: Sharon Akimoto (Professor of Psychology, Carleton College)

Title: *Whites' Responses to Racial Inequity: The Impact of Perspective-taking and Framing*

The current pre-registered study tests the effects of framing and perspective-taking (PT) on Whites' reactions to Black-White occupational inequities. Studies found that Whites were more aware of racial inequities and more supportive of

affirmative action when inequity was framed as White privilege rather than Black disadvantage (e.g. Powell et al., 2005). Taking the perspective of a disadvantaged Black person has been shown to increase Whites' recognition of racial disparities and desire to help (Todd et al., 2012). In addition to main effects of framing and PT, we predicted that framing inequity as Black disadvantage while taking the Black person's perspective would lead to the greatest acknowledgment of inequity and support for affirmative action. Participants perceived greater racial inequity when inequity was framed as Black disadvantage, as opposed to White privilege. PT did not affect perceptions of racial inequity. There were no effects on support for affirmative action. These findings demonstrated the effect of framing, but not PT, on participants' perceptions of racial inequity, suggesting that PT does not enhance Whites' recognition of inequity beyond framing alone.

This experience was funded by: Psychology Department

Live chat from 5:00 - 6:00 p.m.

ZhaoBin Li

Class Year: 2021

Major(s): Mathematics

Title: *Examining lexical competition and recognition in computational speech perception*

1. TRACE is a computational speech model devised by McClelland and Elman (1986) which has been shown to replicate various behavioral experiments. "Computational modelling of an auditory lexical decision experiment using jTRACE and TISK" by Nenadić and Tucker (2020) explored whether TRACE could accurately recognize speech with similar response times as participants in the Massive Auditory Lexical Decision (MALD) project (Tucker et al., 2019). In my research, I critiqued Nenadić and Tucker's analysis and explained why TRACE should not be evaluated through direct comparison to human response times.
2. Lexical competition plays an important role in human speech perception. For instance, when we hear 'beaker', cohort distractors which share the same onset like 'beetle' will compete to get recognized and increase response times. In my research, I programmed an R library to search for various lexical competitors quickly and explored network statistics of lexical competitors graphs.

This experience was funded by: Eugster Endowed Fund for Research and Internships (Career Center)

Live chat from 5:00 - 6:00 p.m.

Oren Lieber-Kotz

Class Year: 2021

Major(s): Geology

Title: *Examining Changes in Water Contaminants Across a Rural-Urban Gradient*

I interned in the Kaushal Lab at the University of Maryland, monitoring and studying the biogeochemistry of streams in urban environments, especially Maryland. My project drew from samples taken from 3 sites in College Park and 9 sites in Baltimore. The sites made up a gradient of differing levels of urbanization, characterized by calculations of the percent of impervious surface cover in each site's drainage area. Calculations were done in QGIS using data from NASA SRTM and the National Land Cover Database. Fluorometer data from samples from the stream sites that were taken throughout the summer, as well as from a 2-year backlog, was used to measure the ratio of protein-like to humic-like contaminants in the water. This ratio was found to significantly correlate with urbanization, mostly due to an increase in protein-like contaminants. I suggest that this change is due to the greater amount of sewage in urban watersheds.

This experience was funded by: Littell Internship Fund (Career Center)

Live chat from 5:00 - 6:00 p.m.

Amy Lin

Class Year: 2021

Major(s): Biology

Supervisor(s) and affiliation or institution: Rou-Jia Sung (Assistant Professor of Biology, Carleton College)

Title: *hot Gene Function in Caenorhabditis elegans*

The ly6 family of proteins are cysteine rich and characterized by highly conserved disulfide bonds stabilizing a three-finger structure. Up to 35 and 61 members of the family have been identified in humans and mice, respectively. One example is lynx1 which was shown to allosterically modulate nicotinic acetylcholine receptors that regulate neuronal communication by binding to the neurotransmitter acetylcholine. However, few have been studied extensively, suggesting potential for regulatory functions of the remaining ly6 members. In *C.elegans*, there are only 10 ly6 proteins, named HOT-1 through 10. Investigating the functions of ly6 proteins in *C.elegans* will advance our general understanding of ly6 proteins. By exploring existing literature, we designed three aims for our future work on ly6 in *C.elegans*:

1. Generate hot gene knockout *C.elegans* strains
2. Modify hot gene locus with experimentally accessible tags
3. Conduct behavioral assays on knockout strains to figure out possible functions of HOT proteins

This experience was funded by: Towsley Endowment for the Sciences (STEM Board)

Live chat from 4:00 - 5:00 p.m.

Izzy Link

Class Year: 2021

Major(s): Sociology/Anthropology

Title: *Northfield Community Action Center Food Shelf Summer Fellowship*

The Community Action Center (CAC) as a whole provides social services for the Northfield and Rice County Community. This summer, I worked in the Food Shelf at the CAC. This work involved coordinating food deliveries and making calls, organizing the food shelf, data entry and collection, and whatever else was needed throughout the day to make sure people were able to pick up food. Through this work, I met a group of amazing staff members that were hard-working and empathetic, even when the days were long and tiring. I additionally met devoted volunteers- many who had been volunteering for multiple years.

This experience was funded by: Weitz Family Foundation Gift (Center for Community and Civic Engagement)

Live chat from 5:00 - 6:00 p.m.

Sara Liu

Class Year: 2022

Major(s): Psychology

Title: *Children With Autism: Play Therapies, Case Studies, Ongoing Research*

This internship was focused on research and observation. The center I worked for treated children ages 3-12 with autism spectrum disorders with the help of a multidisciplinary team which provides therapies (group, family, individual), academic teaching, teaching aides integrated at regular schools, and psychiatric treatment. The center also instigates research on autism in children. I helped primarily with research concerning the use of 3i (intensive, individual, interactive) therapy, a form of play therapy targeted at young children with autism. Several trials conducted at the hospital Pitié-Salpêtrière have shown that this therapy is effective at reducing autism symptoms. This study has implications for developing more effective play therapy treatments for children. As a mixed modality treatment implementing both child-directed activities and caregiver-centered direction, 3i therapy is flexible enough to be used among diverse individuals on the spectrum. It also implicates that long term, lasting progress is likely when children are given intense, long-term therapy.

This experience was funded by: Abeona Endowed Fund for International Internships (Career Center)

Live chat from 4:00 - 5:00 p.m.

Abby Loe

Class Year: 2021

Major(s): Mathematics

Title: *Wezesha Strategic Planning and Research Internship*

I performed research into women, peace, security and sexual violence as a part of the Global Edge program at Carleton. This poster reflects on the work that I did this summer as well as how it shaped my career goals.

This experience was funded by: Robert E. Will '50 Endowed Internship Fund in Social Entrepreneurship (Career Center); Part of the Global Edge Program

Live chat from 5:00 - 6:00 p.m.

Finn Lorenz

Class Year: 2021

Major(s): English

Title: *Marketing and Communications in the Pet Product Industry*

This Summer, I took part in a remote internship with the Americat Company, a cat product startup created a few years ago by Carleton alumna Diane Danforth ('05). I focused primarily on marketing and communications, with my work including creating a style guide for the company, researching and writing educational and promotional blog articles, and writing copy for the product pages on the company's website.

This experience was funded by: Class of 1963 50th Reunion Fund for Internships (Career Center)

Live chat from 4:00 - 5:00 p.m.

Thandie Mangena

Class Year: 2022

Major(s): Biology

Other Authors/Contributors:

Supervisor(s) and affiliation or institution: Bisrat G Debeb, DVM, PhD (MD Anderson)

Emily Schlee Villodre, PhD (MD Anderson)

Xiao Ding Hu, PhD (MD Anderson)

Title: *Associations of NDRG1 and MAPK14 genes with breast cancer*

After skin, breast cancer is the most diagnosed cancer in American women, and one of the most diagnosed in women all over the world. Understandably a lot of research has been invested in figuring out pathways involved to target specific contributors such as genes for treatment, especially for more aggressive breast cancers such as Triple negative breast cancer (TNBC). In the lab I was interning at this summer, they were researching the NDRG1 gene as a possible tumor promoter. This is one important gene because of the contrasting background information available as it is known as both a tumor suppressor and a tumor promoter. This presentation focuses on research of the NDRG1 gene as well as another gene that is affected by the knockdown of the NDRG1 gene, MAPK14.

This experience was funded by: CPRIT Research Training Program at MD Anderson Cancer Center

Live chat from 5:00 - 6:00 p.m.

Rebecca Margolis

Class Year: 2021

Major(s): History

Other Authors/Contributors: Anna Grove, Anna Schumacher, Kristin Miyagi

Supervisor(s) and affiliation or institution:

Title: *Summer Social Justice Internship with IAF Northwest*

I spent the summer learning community organizing skills under the mentorship of Joe Chrastil of IAF Northwest, a regional umbrella organization overseeing local (city-wide) community organizing coalitions. The primary project I worked on was developing the foundations for a 10 hour workshop on settler colonialism aimed at educating non-indigenous people about the effects of settler-colonialism and how it manifests today. I also had the opportunity to observe meetings with two affiliates in Alberta Canada, which provided me a chance to learn about the similarities and differences in how community organizing occurs in different countries.

This experience was funded by: Social Justice Internship (Chaplain's Office)

Live chat from 4:00 - 5:00 p.m.

Natalie Marsh

Class Year: 2021

Major(s): Religion

Supervisor(s) and affiliation or institution: Lori Pearson (Professor of Religion, Carleton College)

Title: *Situating Philosophy of Right in the Study of Religion: Hegel on Gender, Family, and Marriage*

Working alongside Lori Pearson, I conducted a close reading of Hegel's Elements of the Philosophy of Right. We considered how Hegel's understanding of religion and its relationship to gender could enter into dialogue with the theories of Marianne Weber, a sociologist and women's rights activist a century later. In order to track this work, I conducted background research on Hegel's view of gender and the family and synthesized this with annotations from Philosophy of Right. Throughout this process, I focused on the categories of gender, family, and marriage, but also human freedom, the nature of the will, and subjectivity.

This experience was funded by: Dean of the College Office

Live chat from 4:00 - 5:00 p.m.

Katherine Mateos

Class Year: 2021

Major(s): Chemistry

Supervisor(s) and affiliation or institution: Rika Anderson (Assistant Professor of Biology, Carleton College)

Title: *Reconstructing the Evolutionary History of Sulfur Cycling Genes*

The sulfur cycle plays an important yet understudied role in regulating Earth's surface conditions and redox state. The distributions of sulfur isotopes can be used as a proxy for the oxidation state of the early Earth. These geochemical datasets can also be used to reconstruct the evolutionary history of various sulfur-cycling metabolic pathways but suffer from ambiguities and preservational limitations. Here, we used phylogenomics techniques to reconstruct the evolutionary history of the genes responsible for sulfur cycling. We inferred evolutionary events including gene birth and horizontal gene transfer by reconciling phylogenetic trees of relevant genes with a time calibrated tree of life. We found that important sulfur cycling genes arose around ~3000 Mya and radiated widely across the tree of life approximately 1000-500 Mya, tracking with an increase in atmospheric oxygen. These results provide important constraints for understanding the evolution of the microbial sulfur cycle over time.

This experience was funded by: Dean of College Office

Live chat from 5:00 - 6:00 p.m.

Ishmael Maxwell

Class Year: 2021

Major(s): Political Science/International Relations

Title: *Internship at the Near East South Asia Center for Strategic Studies*

At the NESACenter, I conducted research on violent extremism and security in South Asia and the Middle East and supported seminars that bring together senior security practitioners from the US and the NESACenter region. I also managed the NESACenter's Twitter account. My research projects included a paper on the relationship between Iran and Afghanistan, a report on US security interests in South Asia, a matrix outlining the involvement of international actors in the Libya conflict, and support for a biography on Ali ibn abi Talib.

This experience was funded by: Rob White '85 Internship Fund (Career Center)

Live chat from 4:00 - 5:00 p.m.

Rebecca McCartney

Class Year: 2021

Major(s): American Studies, Music

Title: *Exploring Maine's Political and Cultural Landscape Through Sara Gideon's Campaign for US Senate*

As an intern on the Political + Outreach team of Sara Gideon's Campaign for US Senate, I worked to secure support for our candidate from voters and organizations across the state. I corresponded with stakeholders in key campaign policy areas, escalating people from sideline supporters to public endorsers. I also worked to plan and execute non-fundraising events (campaign visits, voter town halls, policy roundtables) by overseeing recruitment, on-site setup, participant follow up, and data entry. In working on one of the cycle's most highly-watched senate races, I learned about the balance of national attention and local support, and deepened my understanding of Maine's political, social, and cultural landscape.

This experience was funded by: Andersen Foundation (American Studies)

Live chat from 5:00 - 6:00 p.m.

Reese McMillan

Class Year: 2021

Major(s): Cinema and Media Studies

Title: *Tattoos and Techno: A Counter-Cultural Aesthetic*

Tattoo artists often bolster the growth of counter-cultural movements by providing distinct aesthetics that embody the spirit and philosophy of those sub-cultures. The focus of my research was on examining and analyzing the tattoo aesthetics of a rising counter-culture in Taiwan: underground electronic music. Through a series of interviews with artists, producers, and more, I sought to understand and contextualize the significance of such a counterculture in a country that has a relatively new national identity.

This experience was funded by: Roy Grow Fellowship

Live chat from 4:00 - 5:00 p.m.

Hana Mensendiek

Class Year: 2022

Major(s): Political Science/International Relations

Title: *Summer Internship at PADECO Co., Ltd.*

This summer, I worked as an intern at PADECO Co., Ltd., an international development consulting company based in Tokyo, Japan. At PADECO I was part of the Education development division, and worked on a range of projects including research assistance, translation work, newsletter editing, and updating/maintenance of their COVID-countermeasures website. I also had the opportunity of participating in PADECO EDD's first webinar. Throughout the internship, I not only learned about the education development sector and gained professional skills, but also was able to think about my future in new ways through direct experience in an unfamiliar field and interactions with mentors. Although this was in many ways an unexpected experience given the pandemic, it was precisely the unexpectedness of this opportunity that was very valuable for me as it introduced me to a new field, group of people, ideas, and working styles that allowed me to reimagine my future.

This experience was funded by: Neil Isaacs and Frank Wright Fellowship Program in Investigative Journalism (Career Center)

Live chat from 5:00 - 6:00 p.m.

Tim Mikulski

Class Year: 2021

Major(s): Physics

Supervisor(s) and affiliation or institution: Cameron Batchelor (PhD Candidate, University of Wisconsin-Madison)

Shaun Marcott (Assistant Professor of Geoscience, University of Wisconsin-Madison)

Ian Orland (Geoscience Program Coordinator, Wisconsin Geological and Natural History Survey, University

Title: *Investigating Precipitation Source Changes in the Previous Glacial Period with Climate Models*

The concentration of oxygen-18 (vs. oxygen-16) is a widely used proxy for temperature in paleoclimate records, including ice cores, cave formations, and marine sediments. Our climate record, a 250,000 year old cave formation from Cave of the Mounds in Wisconsin, shows a very large change in oxygen-18 concentration during abrupt climate events in the previous ice age, which would translate to a local warming of more than 8° C using normal isotope-temperature ratios. This is much larger than the expected warming, so we investigate changes in moisture source as a cause of this large concentration jump. Different bodies of water have different characteristic oxygen-18 concentrations, so we use climate models to attempt to determine the origin of precipitation at the field site during glacial abrupt climate events, and consequently can separate the temperature and precipitation origin portions of our isotope signal.

This experience was funded by: Eugster Endowed Research and Internship Fund (Career Center)

Live chat from 4:00 - 5:00 p.m.

Arya Misra

Class Year: 2022

Major(s): Cinema and Media Studies, Statistics

Title: *Learning the development / Pre-production in Hollywood*

This summer I worked as the producing / coverage intern at Di Bonaventura Pictures Inc. (Paramount Pictures). I was able to work closely with associate and executive producers at Paramount and really understand the ins and outs of the industry, especially that crucial time of project development. Observing this process during the pandemic was especially interesting as I got to learn the impact of halting production. Producers buckled down on searching for potential stories and prepare them for production whenever that happens. Despite its remote status, I learnt so much from this experience and it will be amazing to be able to share that with the community.

This experience was funded by: Sam '75 and Meg Woodside (current use) Fund for Career Exploration

Live chat from 5:00 - 6:00 p.m.

Erika Mitchell

Class Year: 2021

Major(s): Environmental Studies

Title: *Examining the Impact of Food Quality on the Size of Epidemics in Daphnia Populations*

Daphnia are herbivorous filter feeders common in freshwater lakes. We investigated outbreaks of a fungal infection, *Metschnikowia bicuspidata*, in Indiana lakes. Daphnia encounter fungal spores while feeding and are unable to avoid them while filtering. Once Daphnia die from the infection more spores are released into the environment.

Lake phytoplankton quality indicators and the overall prevalence of *Metschnikowia* were collected between 2010-2014. The effects of food quantity have been studied with regard to *Metschnikowia* epidemics, but the effects of food quality are relatively unknown. Higher quality food could slow the spread of an epidemic, because Daphnia would not need to filter as much to get the nutrients they need, decreasing the odds of them eating a spore. Preliminary findings indicate that a steep decrease in the Carbon : Phosphorus ratio (indicating higher food quality) may correlate with a steep increase in the prevalence of *Metschnikowia*.

This experience was funded by: ENTS Endowment Fund (Environmental Studies Program)

Live chat from 4:00 - 5:00 p.m.

Kristin Miyagi

Class Year: 2022

Major(s): Political Science/International Relations

Other Authors/Contributors: Anna Schumacher, Anna Grove, Rebecca Margolis

Title: *Wrestling With the Truth of Colonization and Its Aftermath*

During my remote summer internship, I spent half my time with my supervisor Joe and the Carleton interns at the IAF Northwest. We read and discussed important text about community organizing, leadership, and the history of indigenous peoples in New Zealand, Australia, Canada, and the U.S. as well as designed decolonization material for future workshops. For the other half of my time, I worked with my supervisor Katie at the Spokane Alliance, where I developed critical skills including video editing, working with Canva, making address labels, researching and analyzing recommendations for diversifying building trades apprenticeship programs, delivering clear presentations, writing campaign content for the official website, conducting relational meetings with people via Zoom, and evaluating training sessions. I enjoyed learning the basics of community organizing and the process of running effective campaigns by building power together.

This experience was funded by: Social Justice Internship

Live chat from 4:00 - 5:00 p.m.

Elena Morales-Grahl

Class Year: 2023

Major(s): Undecided

Title: *Webpage explaining what happens to the brain when one gets a concussion*

While interning at Concussion Alliance, a non-profit focused on providing resources for people suffering from brain injuries, my main project was to create a page explaining what happens to one's brain when one gets a concussion. In order to do this, I looked through resources already on the internet and came to realize that most of the information out there is inaccurate and does not align with the most up-to-date research. Because of this, I decided to read through the literature and consult doctors and scientists in order to ensure that I had the most accurate understanding of the topic. I

then talked to patients of concussion to better understand what kind of information they would want to know about their injury. In the end, I created two pages, a simple one and a complicated one, that used text and diagrams to walk through the biology and neuromechanics behind concussions.

This experience was funded by: Elizabeth and George Frost Endowed Internship Fund (Career Center)

Live chat from 4:00 - 5:00 p.m.

Jack Moran

Class Year: 2021

Major(s): Statistics, Mathematics

Other Authors/Contributors: Jaylin Lowe

Supervisor(s) and affiliation or institution: Adam Loy (Assistant Professor of Statistics, Carleton College)

Title: *Overhauling HLMdiag: Updating an R package to conform to the tidyverse*

Multilevel/hierarchical linear models account for the dependence between observations within the same group in nested data structures. Such models are commonly used to analyze the results of agricultural experiments, longitudinal studies, and educational assessments, to name a few. While model-fitting and inferential procedures are widely implemented for this model class, this is not the case for diagnostic tools. In this presentation, we will provide an overview of the R package HLMdiag, which implements a variety of model diagnostics for this model class, including both residual and influence diagnostics. In particular, we will emphasize new features introduced in the 0.4.0 update and how this package was massively overhauled to conform to the tidyverse principles.

This experience was funded by: Towsley Endowment for the Sciences (STEM Board)

Live chat from 5:00 - 6:00 p.m.

Marcel Morris

Class Year: 2024

Major(s): Undecided

Title: *Internship at Deutsche Börse AG*

I completed my internship in my hometown Frankfurt am Main, Germany. As a Market Supervision Specialist at the German Stock Exchange, my work started with tasks in daily operations and a few weeks in, I contributed to development projects. Deutsche Börse's business areas include pre- and post-trading, services for trading and clearing of investment instruments as well as collateral and liquidity management.

The daily business in my division consists of performing trading suspensions and resumptions of securities, monitoring cash market activities and assisting traders and system developers with their questions about trading related topics. I had access to the simulation environment of our real exchange market system which is used for tests and implementing new features. I worked closely with IT and traders to ensure that future updates will run smoothly on our system.

This experience was funded by: Richard T. Newman Family Endowed Fund for Language Study Internships (Career Center)

Live chat from 4:00 - 5:00 p.m.

Rebecca Muhlheim

Class Year: 2021

Major(s): Geology

Supervisor(s) and affiliation or institution: Dr. Ellyn Enderlin (Assistant Professor of Geosciences, Boise State University)

Title: *Changes in Terminus Position and Ice Flow Velocity of Greenland's Marine-Terminating Peripheral Glaciers, 2000-2018*

Despite covering only ~5% of Greenland's total land area, peripheral glaciers and ice caps (GICs) in Greenland are estimated to have contributed up to 20% of the island's recent ice mass loss. While studies have used atmospheric models to estimate Greenland GIC surface mass balance over the last few decades, the effects of climate forcings on glacier dynamics and resulting mass loss remain uncertain. Here I use a collection of remotely sensed ice elevation and velocity data to identify changes in terminus position, ice flow velocity, and surface elevation for 641 GICs across Greenland and look for regional and temporal trends in glacier behavior. Results show that while many GICs retreated, accelerated, and thinned in the early 21st century—as has been observed broadly across the Arctic—others slowed and advanced. The magnitude and timing of dynamic change vary both regionally and between adjacent fjords, highlighting the effects of regional climate variation and small-scale geometric and topographic controls on glacier dynamics.

This experience was funded by: Kolenkow-Reitz Fund (STEM Board)

Live chat from 5:00 - 6:00 p.m.

Anwasha Mukherji

Class Year: 2023

Major(s): Undecided

Title: *Wildlife Rehabilitation Intern (non-research related internship)*

The mission of the Peninsula Humane Society & SPCA's Wildlife Care Center is to rehabilitate and release sick, injured, and orphaned animals so they may live without human imprint. As a wildlife intern at the Wildlife Care Center, I cared for small mammals, songbirds, seabirds and marsh birds that live in the San Francisco Bay Area. I gained hands-on experience in wildlife ethics, capture and restraint, parasitology, radiology, hematology, clinical procedures, and surgical nursing and assisting. The internship also allowed me to expand my knowledge in species identification, animal nutrition, lab work, emergency care, and diagnosis and treatment of illnesses and injuries. Most importantly, this summer's experience not only highlighted the impact of human activity on local wildlife but also how we can mitigate the negative effects through rescue, rehabilitation, release, and respect for our wild neighbors.

This experience was funded by: The Sam '75 and Meg Woodside (current use) Fund for Career Exploration (Career Center)

Live chat from 4:00 - 5:00 p.m.

Sophia Myers

Class Year: 2021

Major(s): History

Title: *What Makes a NonProfit*

I was part of a collaborative effort in the Believet Canine Service Partners to pull together or implement the paperwork and policies needed in order to receive accreditation by the Assistance Dogs International. I had a mostly paperwork experience, especially given the circumstances of remote work, but I was really able to get into the nitty-gritty of what a well-run, small non-profit looks like from a legal side with their documents, an ethical side with their policies and protections, and a political nature with understanding their board and management plan. By the end, we had a comprehensive collection of documents exhibiting the high quality of Believet for the ADI to use.

This experience was funded by: The Sam '75 and Meg Woodside (current use) Fund for Career Exploration (Career Center)

Live chat from 4:00 - 5:00 p.m.

Rose Newell

Class Year: 2021

Major(s): Biology

Title: *Organismic Immune Research with the Snell-Rood Lab*

This summer I conducted a literature review as well as hands on lab and field work for three separate ongoing research projects for the Snell-Rood Lab at the University of Minnesota (Twin Cities). The two literature review projects we initiated this summer focused on the Tasty Chick Hypothesis, concerning bird nestling immunocompetence, and on the mating decisions of parasitized females. For the lab research, we raised cabbage white butterfly caterpillars on diets of low, control, or high levels of zinc in an ongoing experiment to determine how different levels of heavy metals in the environment impact the immunocompetence of different butterfly species.

This experience was funded by: Eugster Endowed Research & Internship grant (Career Center)

Live chat from 5:00 - 6:00 p.m.

Katy Oda

Class Year: 2022

Major(s): Physics

Supervisor(s) and affiliation or institution: Ryan Terrien (Assistant Professor of Physics and Astronomy, Carleton College)

Title: *Improving Precision for Measuring Projected Rotational Velocity with the Habitable Zone Planet Finder*

From age, to activity, to orbital configuration, measuring the projected rotational velocity ($v_{\text{sin}i}$) of stars can reveal a lot about the stars themselves. The Habitable Zone Planet Finder Spectrograph (HPF) measures the spectra of nearby stars, looking for shifts which occur as the result of orbiting planets. The features of those spectra also encode information about rotation rates. When a star rotates, its spectral features broaden; by cross-correlating with a mask of stellar features, we are able to measure the widths of the features and therefore estimate the $v_{\text{sin}i}$. Here, we test the application of this cross-correlation (CCF) method to HPF data. By refining the calibration process, the features we measured, and how we implemented the CCF method, we improved the precision of the $v_{\text{sin}i}$ measurements. Those improvements were integrated into a preexisting code package accessible to the wider HPF team, and can be expanded for use on other datasets.

This experience was funded by: Towsley Endowment for the Sciences (STEM Board)

Live chat from 4:00 - 5:00 p.m.

Jelilat Odubayo

Class Year: 2021

Major(s): English

Title: *"can we speak in flowers?": A Poetics of Interiority in Nayyirah Waheed's salt*

Nayyirah Waheed's 2013 poem collection *salt* is distinguished by a poetics of interiority that centers the inner, psychic lives informed by black diasporic women's experiences. With good reason, black writers, artists, and critical thinkers have centered pan-diasporic efforts toward being more free by emphasizing participation and expression in public spheres. As Mae G. Henderson, Kevin Quashie, and other scholars have pointed out, there is conceptual danger in aligning legitimate, or liberated, subjectivity with recognition in public spheres. This is especially salient for black women, who encounter threats of material and psychic erasure and silencing because of the complex subject positions we occupy. In response, black women writers such as Zora Neal Hurston, Audre Lorde, and bell hooks have and continue to do the work of writing the interior lives of black women before, during, and long after public displays conclude. Therefore, I propose that a poetics of interiority, rooted in self-examination and exploration of the interior by black women, has the potential to speak to and beyond exterior conditions. In particular, Nayyirah Waheed's poem collection enacts these poetics in ways that resist being made psychically and materially invisible.

This experience was funded by: Mellon Mays Undergraduate Fellowship

Live chat from 5:00 - 6:00 p.m.

Freja Olsen

Class Year: 2021

Major(s): Physics

Supervisor(s) and affiliation or institution: Ryan Terrien (Assistant Professor of Physics and Astronomy, Carleton College)

Title: *Versatile Continuum Normalization for Precise Spectral Measurements with the Habitable-Zone Planet Finder*

The abundances of certain metals in stars can tell us much about the properties of the star and the exoplanets it hosts. Abundances are measured by measuring the depths of spectral absorption lines below the continuum. For M dwarf stars, it is difficult to identify a consistent continuum level due to the complexity of their spectra. To get accurate measurements we need to normalize the continuum and devise ways for determining precision. I wrote a program that normalized the spectrum so that it was consistent for all stars and tested the precision of the resulting measurements by performing statistical analysis on frequently observed stars and finding distribution for the equivalent widths found. This created usable methods for preparing new spectra for analysis and determining uncertainties for new lines that greatly reduce the time needed for finding equivalent widths of spectral lines to be used for determining abundances.

This experience was funded by: Minnesota Space Grant Consortium (Physics and Astronomy Department)

Live chat from 4:00 - 5:00 p.m.

Win Wen Ooi

Class Year: 2022

Major(s): Sociology/Anthropology

Title: *Internship at Arts-ED: Place-Making in Penang, Malaysia*

Arts-ED is an NGO based in George Town, Penang, Malaysia that specializes in community-based arts and culture education for place-making and cultural sustainability. Over the summer, I engaged in multiple dimensions of Arts-ED's work, from a research study on the cultural and economic resilience of small endogenous trades on a street in the George Town UNESCO World Heritage Site in the face of COVID-19, to capacity-building programs for educators, artists, and cultural workers in engaging community through creative and culturally-sustaining approaches. This experience was invaluable in clarifying and reinforcing my passion for community-based research and community-building work in especially the Malaysian context, as well as deepening my appreciation for sociological and anthropological perspectives and methods.

This experience was funded by: The Initiative for Service Internships in International Development (Career Center)

Live chat from 5:00 - 6:00 p.m.

Beck Page

Class Year: 2023

Major(s): Undecided

Title: *Furmano's Summer Internship*

Going in to this internship I was hoping to achieve a variety of different things yet at the same time I was very uncertain to how my journey would go. I had many goals to improve upon myself and my workplace abilities. All in all I feel as though I was able to accomplish many of these goals very successfully. My ability to properly communicate in a workplace environment and act professionally has improved dramatically. Additionally I was able to learn a lot about different office technologies through extensive work with a variety of different sources. Additionally I learned a lot about markets and supply and demand relationships specifically relating to the food industry. I spent most of my time managing the supply of the procurement side of the company through creating and editing purchase and Blanket orders and sending out updates to our vendors. One of the greatest tasks that I accomplished was creating all the new purchase orders for the first 4 months of 2021. This was tough with both the sheer quantity of orders and how for the most part I was very much on my own in the creation of these new orders. All in all, my internship this summer was a great experience to help me grow both as a worker and as a person and I'm very thankful to all those who helped make it happen.

This experience was funded by: Kathryn Christen Ramstad '79 Endowed Internship Fund (Career Center)

Live chat from 5:00 - 6:00 p.m.

Alli Palmbach

Class Year: 2021

Major(s): Environmental Studies, Political Science/International Relations

Title: *My Summer Internship with the EPA:*

I spent the summer working as a student intern with the Environmental Protection Agency (EPA). I worked in the office of Congressional and Intergovernmental Affairs (OCIR). Due to covid-19, I completed the internship remotely from my home in Suamico, WI. In This internship I completed a wide variety of tasks for OCIR. I began the internship by researching upcoming legislature, then drafting a brief and presentation to educate upper-level EPA executives about the legislature. I then made several infographics illustrating OCIR initiatives to the public. I also worked on ARCGIS to create many maps to visualize EPA data for OCIR. These maps will likely be used for public outreach, as well as metric analysis for the EPA. My final assignment was to meet with a head of a different department and brainstorm how better to obtain metrics and analysis for her department.

This experience was funded by: Jean Phillips Memorial Internship (Career Center)

Live chat from 4:00 - 5:00 p.m.

Kanishk Pandey

Class Year: 2023

Major(s): Undecided

Supervisor(s) and affiliation or institution: Dr. Christopher West (Visiting Assistant Professor of Physics)

Title: *Galactic Isotopic Decomposition for the Sculptor Dwarf Spheroidal Galaxy*

Stellar evolution models require initial isotopic abundance sets as inputs, and the yields are used in galactic chemical evolution (GCE) models and other nucleosynthesis studies. Reliable abundances are challenging to infer from elemental observations and are galaxy specific. We present an isotopic history for the Sculptor dwarf spheroidal (dSph) galaxy based on the astrophysical processes responsible for isotopic production, which is a complementary approach to GCE models. Each astrophysical process was modeled according to the underlying physics that dictate their chemical evolution. The isotopic model was summed into elements and fit to observational Sculptor abundance data to fix the free parameters. This procedure gives an isotopic history of Sculptor for massive star, SNe Type Ia, and main s-process contributions. We find SNe Type Ia contributes approximately 85% to the solar Fe abundance, which is greater than typical MW values of approximately 70%, in agreement with other dSph chemical evolution studies.

This experience was funded by: Fath Fund (Physics and Astronomy Department)

Live chat from 5:00 - 6:00 p.m.

Grace Pearson

Class Year: 2021

Major(s): Environmental Studies

Title: *Science Communications and Development Internship with Monarch Joint Venture*

I worked with Monarch Joint Venture, the leading monarch butterfly conservation organization in their departments of science communications and non-profit development. The majority of my time was spent assisting in research, analysing and proofing data, promoting community science projects and communicating relevant research findings to the public. I also helped research and write applications for grants for special projects related to tri-national conservation initiatives.

This experience was funded by: The Sam '75 and Meg Woodside (current use) Fund for Career Exploration (Career Center)

Live chat from 4:00 - 5:00 p.m.

Asha Penprase

Class Year: 2021

Major(s): Political Science/International Relations

Title: *Organizing local COVID-19 relief in Northfield*

As an intern with Northfield Healthy Community Initiative, I helped coordinate COVID-19 related relief programs for the community. My three major tasks were assisting with mobile food distribution in Faribault, putting together take-it-home summer camp bags for kids who ordinarily qualify for the school district's summer camp program, and collaborating with local businesses to put coloring pages in town for kids. I also taught five virtual zoom summer camp classes for K-6 kids.

This experience was funded by: Jean Phillips Memorial Internship Fund (Career Center)

Live chat from 4:00 - 5:00 p.m.

Logan Peters

Class Year: 2021

Major(s): Cognitive Science, Computer Science

Supervisor(s) and affiliation or institution: Dr. Chenliang Xu (University of Rochester)

Title: *Undergraduate Research Assistant*

CAM heatmaps are often used to localize objects in images based on image level labels. However, due to lack of spatial information in label supervision, they fail poorly at identifying edges or the precise size of objects without additional regularization. We demonstrate that a Deep Grouping Model (DGM) can remedy some of these problems. Its structure causes the CAM to produce sharper, better defined edges, while the different levels of the model allow the CAM to precisely segment objects of different sizes. In particular, the DGM's hierarchical nature encourages it to respect object boundaries while the fact that it functions by iteratively grouping superpixels encourages large and smooth groupings. Our experiments on Pascal VOC 2012 demonstrate that adding a CAM head improves the segmentation performance of a ResNet baseline.

This experience was funded by: Dr. Chenliang Xu (University of Rochester); The Sam '75 and Meg Woodside (current use) Fund for Career Exploration (Career Center)

Live chat from 5:00 - 6:00 p.m.

Astrid Petropoulos

Class Year: 2023

Major(s): Undecided

Supervisor(s) and affiliation or institution: Catherine L. Reed (McElwee Family Professor of Psychology and a George R. Roberts Fellow, Claremont McKenna College)

Title: *Non-uniform Effects of Age Across Tasks: An ERP Study*

The purpose of this research is to investigate whether aging has a general effect on neural processing or whether it targets specific cognitive processing mechanisms. Previous EEG and ERP aging literature suggests that older adults have smaller ERP amplitudes and longer latencies, as well as an increased potential for frontal recruitment (Reuter-Lorenz & Cappell 2008). Researchers have suggested that these aging effects are similar for all cognitive processes, however no study has tested this hypothesis by comparing processing within the same individuals across multiple tasks. Our study analyzed results from face processing (N170), attention and categorization (P3), semantic processing (N400), and error processing (ERN) tasks for both old (ages 60-85) and young (18-30) adults, and each subject completed each task. Our analysis found that face perception (N170) and error processing (ERN) show similar amplitudes and latencies across age,

however, we found age-related differences for attention and categorization (P3) and Semantic Processing (N400) in terms of amplitudes, latencies, and focal distribution of neural response. Therefore, our research concluded that, contrary to previous research, aging does not affect neural processing similarly across cognitive tasks when analyzing various cognitive mechanisms within the same individuals.

This experience was funded by: Catherine L. Reed (McElwee Family Professor of Psychology and a George R. Roberts Fellow, Claremont Mckenna College); The Sam '75 and Meg Woodside (current use) Fund for Career Exploration (Career Center)

Live chat from 4:00 - 5:00 p.m.

Minh Pham

Class Year: 2022

Major(s): Computer Science

Supervisor(s) and affiliation or institution: Layla Oesper (Assistant Professor of Computer Science, Carleton College)

Title: *Generating the Space of Clonal Trees that Underlie Tumor Evolution*

Trees are used to model the evolutionary history of a tumor. Labels on the trees' nodes are used to represent the mutations acquired during a tumor's development. There has been continuing efforts to devise methods to infer these trees from bulk and single-cell sequencing. To aid the process, we worked on quantifying the space of all the clonal trees, which are trees that allow multiple labels on each node. We first enumerate and visualize all the trees with a small number of nodes. We first restrict to only trees whose nodes contain exactly one label each, by enumerating the set of Prufer sequences, which is mapped by a bijection to the set of all single-labeled vertex trees. Then, we partition the labels onto the nodes of the generated single-labeled vertex trees, to generate all the clonal trees. We store this data for further analysis of numerically quantifying this space.

This experience was funded by: National Science Foundation CRII: III: RUI (Layla Oesper)

Live chat from 5:00 - 6:00 p.m.

Rayna Phelps

Class Year: 2021

Major(s): Economics

Title: *Equal Employment Opportunity Commission Enforcement Internship*

At the EEOC, I interviewed over 100 members of the public who alleged that they had been discriminated against by their employer because of their race, color, religion, sex, national origin, age, disability, or genetic information. Based on these interviews, I made recommendations about whether the EEOC should pursue further investigation of the cases. In the internship, I developed my communication, legal writing, and analytical reasoning skills. My internship was virtual, so I also gained experience with remote work.

This experience was funded by: Rob White '85 Internship Fund (Career Center)

Live chat from 4:00 - 5:00 p.m.

Noah Pinkney

Class Year: 2022

Major(s): Physics, Mathematics

Supervisor(s) and affiliation or institution: Arjendu Pattanayak (Professor of Physics, Carleton College)

Title: *Tunneling and Entanglement in Many-Body Kicked Spin Dynamics*

We present our findings on the entanglement dynamics of the many-body quantum kicked top. Despite the presence of classical-like rigid boundaries in the Husimi projections of our system, the dependence of tunneling dynamics on initial

conditions cannot be understood in any way by the behavior in the classical limit. Contradictions to this presumption can be found across many configurations of the system's parameters. We seek to understand the deep-quantum dynamics in terms of the symmetries of the kicked top's Hamiltonian and the corresponding Floquet operator's spectral decomposition.

This experience was funded by: Ford Fund (Physics and Astronomy Department)

Live chat from 5:00 - 6:00 p.m.

Alex Poeschla

Class Year: 2021

Major(s): Biology

Supervisor(s) and affiliation or institution: Wenxiang Sun (University of Utah)

Title: *Abcb10 as Regulator of T Cell Memory Function and IKAROS and GFI1 Co-regulation of T cell development*

Abcb10 is a mitochondrial transporter protein known to be involved in T cell metabolism. The Tantin lab previously showed that loss of Abcb10 in T cells resulted in metabolic shifts, and hypothesized that Abcb10 loss in T cells would affect metabolism and T cell memory function. A Western blot of the isolated mitochondria of six different cell samples with two antibodies, Proteintech 14628 and Invitrogen PA5 30468, was done to determine if Abcb10 protein expression could be detected. Abcb10 protein expression was detected using the Invitrogen PAS-30468 antibody. GFI1 and IKAROS are both transcriptional regulators implicated in T cell development. The Tantin lab showed that Notch3 was co-regulated by these genes, but sought to determine if IKAROS was absolutely required for Notch3 expression. Western blotting was used to indicate whether Lenalidomide degraded IKAROS protein. Loss of IKAROS protein was detected after Lenalidomide treatment. This Western blot was part of a larger experiment that showed that GFI1 and IKAROS are co-regulators of Notch3 expression.

This experience was funded by: Wenxiang Sun (University of Utah); Eugster Endowed Research and Internship Fund (Career Center)

Live chat from 5:00 - 6:00 p.m.

Tony Qiang

Class Year: 2023

Major(s): Undecided

Supervisor(s) and affiliation or institution: David Alberg (Professor of Chemistry, Carleton College)

Gretchen Hofmeister (Professor of Chemistry, Carleton College)

Title: *Evaluation of Transition State Analogues for Organocatalyst Desymmetrization Reactions*

Molecules that are non-superimposable mirror images of one another (like right and left hands) are ubiquitous in nature and in useful therapeutic drugs. We are studying how a single hand of a drug, such as pregabalin (Lyrica), can be prepared using a "handed" catalyst. The catalyst lowers the energy of the transition state (TS), or the unstable arrangement of reactants as they transition to products, leading to the right hand of the product relative to the left. We prepared stable mimics of the TS, or transition state analogues (TSAs), to study the catalyst used to prepare pregabalin. We evaluated the relative strength of binding of each hand of the TSA to the catalyst for this reaction and compared that with the preferred product. Of two TSAs we studied, we found they are not good mimics of the TS. Future work will focus on computational modeling to understand these results.

This experience was funded by: The Donors of the American Chemical Society Petroleum Research Fund (Gretchen Hofmeister)

Live chat from 5:00 - 6:00 p.m.

Dani Rader

Class Year: 2021

Major(s): Religion

Other Authors/Contributors:

Supervisor(s) and affiliation or institution:

Title: *Activity Coordinator at KidVentures*

This summer I worked in-person as an Activity Coordinator at the KidVentures childcare program at Bridgewater Elementary School in Northfield, MN. At my internship site, the age of my campers ranged from around 5 to 12 years old. During the day I would lead or assist in craft projects with the students, and this required me to take time to prepare for and troubleshoot the activity set up. I also regularly assisted the staff with COVID-19 cleaning and safety precautions by enforcing social distancing when possible amongst campers, cleaning toys and surfaces, and monitoring student health. I was also able to spend time with campers throughout the day on the playground, in the gym, and during their reading periods. Through this experience, I developed concrete leadership and organizational skills in an educational setting and developed meaningful relationships with campers. I also gained important insight into how to resolve interpersonal disputes between students and how to appropriately challenge different age groups.

This experience was funded by:

Live chat from 5:00 - 6:00 p.m.

Marlena Resnick

Class Year: 2021

Major(s): American Studies

Title: *Organizing a March With Rev. Al Sharpton: My Summer as an Intern for National Action Network*

As a Summer Policy Fellow for Rev. Al Sharpton's civil rights and racial justice organization, National Action Network, I helped organize the "Get Your Knee Off Our Necks" Commitment March on Washington. I worked virtually with my supervisor and one other intern to contact over 200 march participants, including National Partners, speakers, caterers, and families affected by police violence. Additionally, I composed and edited emails and proposals that went out to members of Congress, activists, and leaders of major labor and civil rights groups. Throughout the summer, I cultivated partnerships with local and national organizations via phone and email, answering their questions in order to ensure that the march ran smoothly. The night before the march, I contributed to Rev. Al Sharpton's keynote address that he gave to over ten thousand guests. I learned how to trust myself professionally and value my knowledge and abilities as the summer progressed, and I feel proud to have contributed to the success of such a major event.

This experience was funded by: Rob White '85 Internship Fund (Career Center)

Live chat from 4:00 - 5:00 p.m.

Anna Roberts

Class Year: 2022

Major(s): Biology

Title: *Moving Northfield towards Zero Waste*

This summer I worked as a Sustainability Assistant for the City of Northfield. Under supervision, Beth Kallestad, Program Coordinator for Northfield's city government, I researched policies and programs related to waste reduction, compost, and recycling, and helped craft a Zero Waste Plan for the city. In writing the Zero Waste Plan, I drew on a variety of sources including the EPA, other cities' plans, scholarly articles, and local businesses and community leaders to craft a series of projects and ordinance changes that could be adopted to by the City Council to advance the goal of becoming "zero waste" by 2030. This project was a valuable learning experience, allowing me to improve my writing skills, practice receiving feedback, and expand my research capabilities to include interviews and outreach to community members.

This experience was funded by: Littell Internship Fund (Career Center)

Live chat from 5:00 - 6:00 p.m.

Diana Rodriguez

Class Year: 2022

Major(s): Chemistry

Supervisor(s) and affiliation or institution: Deborah Gross (Professor of Chemistry, Carleton College)

Title: *Air Quality in Northfield, MN Due to Wood Combustion, A Preliminary Study*

Elevated production of smoke from burning biomass affects both global and local public health due to the negative effects of smoke inhalation. High concentrations of particulate matter (PM2.5) downwind of the source can increase the likelihood of respiratory illness. In this study, we evaluate citizen concerns regarding a local restaurant potentially emitting high levels of smoke via a "citizen science" based approach. We recruited 7 people to measure the PM2.5 concentration at locations circling the restaurant in question in downtown Northfield, MN, to determine if the smoke complaints by a neighbor were consistent with this restaurant being the source. PM2.5 measurements were made with low-cost AirBeam sensors operated by participants at predetermined intersections downwind or upwind of the restaurant. Although the measurements obtained were all relatively low values of PM2.5, relative to one another the locations downwind of the restaurant had significantly higher PM2.5 levels than did those downwind. This study provides preliminary data that can help citizens quantitatively assess the impact of local pollution sources on their health.

This experience was funded by: Towsley Endowment for the Sciences (STEM Board)

Live chat from 4:00 - 5:00 p.m.

Maya Rogers

Class Year: 2022

Major(s): Psychology

Title: *Social Justice and Communication at TakeAction MN*

My internship at TakeAction MN was with the communications team and I worked on updating the organization's website through Wordpress and compiling demographic reports on users from their 123,000 person database as well as conducting informational interviews with eight employees.

This experience was funded by: John '55 and Bonnie Raines Endowed Internship Fund (Career Center)

Live chat from 5:00 - 6:00 p.m.

Tom Rubino

Class Year: 2021

Major(s): Biology

Title: *The Heart-Brain Connection*

The connection between congenital heart disease and neurodevelopmental impairment is well documented. Current explanation for this phenomenon can be attributed to external factors, such as hemodynamic insufficiency, operation time, length of hospital stay, post-operative seizures, and socioeconomic factors. However, common genes associated with congenital cardiological defects have simultaneously been observed in neurologically impaired mice. Therefore, we hypothesize the presence of a stronger genetic component in the heart-brain connection than previous literature indicates. Using novel in vivo 4D MRI of mouse embryos in a pregnant mother, we have discovered that placental function helps determine the neurodevelopmental and cardiological outcome of two pups with identical genetic defect. This finding could implicate placental modulation as a potential intervention strategy to overcome intrinsic genetic disadvantages.

This experience was funded by: The Sam '75 and Meg Woodside (current use) Fund for Career Exploration (Career Center)

Live chat from 4:00 - 5:00 p.m.

Caroline Saksena

Class Year: 2023

Major(s): Undecided

Title: *Understanding Concussions: A Simple Webpage on the Neuroscience and How Understanding can Help Contextualize Experiences*

My first hand experience with concussions and my interest in neuroscience attracted me to concussion advocacy work of Concussion Alliance, an organization that helps concussion patients through their recovery. Through my internship, I developed two Squarespace web pages, in collaboration with fellow intern Elena Morales-Grahl, detailing what happens to your brain if you get a concussion. We collaborated on background research and designing an accurate, accessible, and engaging way to present current understandings. I presented on our project to guest speakers, peer Carleton student interns, Concussion Alliance founders and friends. Additionally, I had the opportunity to present to my fellow interns, mentors and supervisor about my experiences with concussions and how my internship helped me understand and contextualize my own experiences. One challenge I had was in reliving my traumatic experiences with a concussion, and I found support and ultimately healing through talking with other concussion patients turned advocates.

This experience was funded by: The Sam '75 and Meg Woodside (current use) Fund for Career Exploration (Career Center)

Live chat from 5:00 - 6:00 p.m.

Valerie Salazar

Class Year: 2021

Major(s): American Studies

Title: *Interning for an Immigration Law Firm*

This past summer I had the opportunity in working at the Immigrant Law Center of MN as the Pro Bono Program Intern. This internship lasted 10 weeks this summer and was fully remote. During this internship I learned how to become more flexible and more organized because the firm was also going through a big transition period of going from working in the office to working at home. The following is my experience and a more detailed description of what I did this summer.

This experience was funded by: Social Justice Internship Fund (Chaplain's Office)

Live chat from 4:00 - 5:00 p.m.

Nell Schafer

Class Year: 2023

Major(s): Undecided

Title: *Internship with Community Education Partnerships*

During the summer of 2020, I interned virtually for a non-profit organization called Community Education Partnerships (CEP). This organization provides educational support for homeless and highly mobile children in the Bay Area. While I originally thought my internship would be a mix between in-person and virtual work, my internship ended up being fully virtual and was made up of a variety of different tasks. These tasks included managing the organization's social media, auditing and updating their website, and putting together tutorials for the volunteers and families that the organization worked with to help them get used to this new virtual world. This internship taught me a lot of important skills for future employment, including independence, taking initiative and being professional and prepared. I also learned a lot about the impacts of homelessness on the educational achievements of students and ways that to counter those obstacles.

This experience was funded by: Marrella Endowed Internship Fund (Career Center)

Live chat from 5:00 - 6:00 p.m.

Sophie Schafer

Class Year: 2021

Major(s): Mathematics

Title: *Children of Incarcerated Caregivers*

This summer I worked for an incredibly non-profit organization, Children of Incarcerated Caregivers ("CIC"). Based in Minneapolis, they provide support and services to families and children impacted by incarceration. They also work on the legal matters surrounding incarceration of parents and caregivers, but my work was primarily focused on community outreach. I spent the summer doing many tasks, but one main one was starting and running their social media networks, which was very fun, and new to me. I took this project on as I realized it could be a great way to expand their audience and provide services to their families. We were also starting a podcast regarding racism and discussing race and police brutality with children of color, so social media was a great way to broadcast this. I finished off the summer by connecting with the YMCA in Minneapolis to build bridges between CIC and the Y. I was focused on finding point people for us to connect with, learning what exactly is available, and build a guide for us to hopefully someday make a merge. The goal was exciting, as they hope that it could then become a nationwide plan to enact for all families and children impacted by incarceration.

This experience was funded by: Trace McCreary '89 and Alissa Reiner Endowed Internship Fund (Career Center)

Live chat from 4:00 - 5:00 p.m.

Ben Schnieders

Class Year: 2021

Major(s): Biology

Title: *Using Genetics for Conservation Mycology*

I spent the summer processing data from molecular biological experiments being performed in the Osmundson lab at the University of Wisconsin La Crosse. The lab is working on several projects involving identifying a potentially novel, high altitude species of morel mushrooms, studying the microbial makeup of a marsh near La Crosse, Wisconsin to examine the effects of nearby land usage on the wetland, and examining the evolutionary relationship between mushroom strains by building phylogenetic trees.

This experience was funded by: Littell Internship Fund (Career Center)

Live chat from 5:00 - 6:00 p.m.

Anna Schumacher

Class Year: 2021

Major(s): Psychology

Other Authors/Contributors: Anna Grove, Rebecca Margolis, Kristin Miyagi

Title: *Developing Organizing Skills with a Broad-Based Community Organization*

During my remote summer internship, I spent half my time with my supervisor Joe Chrastil and the Carleton interns at the IAF Northwest. We read and discussed important texts about community organizing, leadership, and the history of indigenous peoples in New Zealand, Australia, Canada, and the U.S. as well as designed decolonization material for future workshops. For the other half of my time, I worked with lead organizer Dorothy Gibson at Sound Alliance, where I built relationships through conducting 1:1 meetings with affiliate members, attended and contributed to strategy team meetings, and supported the groups work through maintaining their website and sending out important communication materials. I am deeply grateful for the opportunity to learn the basics of community organizing and the process of running effective campaigns from the oldest community organizing group in the USA.

This experience was funded by: Social Justice Internship funding (Chaplain's Office)

Live chat from 4:00 - 5:00 p.m.

Molly Schwartz

Class Year: 2023

Major(s): American Studies

Title: *KidVentures Summer Intern: Childcare During the Pandemic*

This summer I worked as an activity intern at KidVentures Summer Camp. KidVenture (KV) provides children, ages 5-12, with fun enriching summer activities. Every day I would help organize or facilitate an art project. Over the first few weeks I began to learn some techniques of how to maintain the kids' attention and how to inspire them to think outside the box. To ensure the safety and health of students and staff everyone wore a mask, did a daily temperature check, and cleaned the classrooms every day. The most rewarding part of the internship was knowing the impact being able to come to summer camp was having on these young kids lives. All of them had spent months in quarantine away from their friends, school, and general structure of early childhood. I really cherished the chance to make a difference in their lives.

This experience was funded by: Anderson Foundation

Live chat from 4:00 - 5:00 p.m.

Shelly Seth

Class Year: 2023

Major(s): Undecided

Title: *Concussion Alliance Summer 2020 Internship*

Concussion Alliance is a nonprofit organization that aims to provide education and treatment options for those who have sustained a concussion. Their website gives information on how someone is affected by a concussion, potential treatment options, and resources for providers and other medical professionals who aid in concussion treatment. Throughout my internship, I wrote for their biweekly newsletter that gave information on recent research relating to concussions, edited and posted interviews with medical professionals for their blog, and created my own web page that focused on a specific treatment for concussions for their website. Additionally, I gave a presentation showcasing my work to a group of medical professionals involved in the internship, my supervisors, and my fellow interns.

This experience was funded by: Class of '64 Endowed Internship Fund (Career Center)

Live chat from 5:00 - 6:00 p.m.

Mehdi Shahid

Class Year: 2022

Major(s): Physics

Supervisor(s) and affiliation or institution: Deborah Gross (Professor of Chemistry, Carleton College)

Title: *Characterization of Aerosol Particle Emissions from Cookstove Prototypes for Use in Ethiopia*

Emissions from biomass cookstoves pose adverse health concerns to millions of people worldwide, and result in significant environmental issues. The Ethiopia Cookstove Project aims to develop an improved cookstove as an affordable and cleaner alternative. We investigated particulate matter (PM_{2.5}) emissions from various cookstove prototypes to determine the efficacy of each. Using a simulated kitchen to collect emissions and Aerosol Time-of-Flight Mass Spectrometry (ATOFMS), we determined particle compositions for each stove design. A data-mining approach was used to group these particles into 12 types of particles for each stove. We found that stoves with cylindrical combustion chambers and fans produced lower pollutant emissions. These results can be used to determine stove designs for cleaner, affordable and sustainable cookstoves.

This experience was funded by: Dean of the College Office

Live chat from 4:00 - 5:00 p.m.

Alexis Shuck

Class Year: 2021

Major(s): Political Science/International Relations

Title: *Internship at Laura Baker*

This summer, I worked as an intern for Laura Baker in Northfield, MN. Laura Baker is a disability services provider that offers affordable housing, creative arts programs, and educational services for people living with IDD. I was working as their public policy and advocacy intern this summer. I also helped out in their communications department.

This experience was funded by: Jean Phillips Memorial Internship Fund (Career Center)

Live chat from 5:00 - 6:00 p.m.

Nariah Sims

Class Year: 2021

Major(s): Psychology

Title: *Apex Summer Treatment Program Camp*

For two months I worked with the University of Washington Autism Center at their Apex Summer Treatment Program Camp designed for children with autism spectrum disorder and attention deficit hyperactivity disorder. I trained intensively for two weeks with: didactic sessions, directed readings, case-reviews, pivotal response treatment, social skills training, data-based evaluation, autism intervention, rehearsal of program components, and consultation from experts on multiple aspects. During the next four weeks I worked closely with my team to provide activities for the campers (aged 11-13 years of age) assigned to my group during Apex's intensive therapeutic treatment program day camp. At the end of each camp day my team consulted our head counselor with any clinical concerns regarding specific children's problematic patterns or behaviors and decided if intervention was necessary, to appropriately support the child.

This experience was funded by: The Sam '75 and Meg Woodside (current use) Fund for Career Exploration (Career Center)

Live chat from 4:00 - 5:00 p.m.

Madi Smith

Class Year: 2022

Major(s): Psychology

Title: *Traumatic Stress Study- Denver University*

My internship took place at Denver University in the Psychology department. Specifically, I worked in the Traumatic Stress Studies Laboratory. Due to COVID-19, I worked remotely. The study for this lab that I worked on consisted of looking at tweets talking about domestic violence before, during and after quarantine in Denver, CO. Each week, tweets would be compiled and I would code 10% of the tweets.

This experience was funded by: The Sam '75 and Meg Woodside Endowed Fund for Career Exploration (Career Center)

Live chat from 5:00 - 6:00 p.m.

David Stem

Class Year: 2021

Major(s): Chemistry

Supervisor(s) and affiliation or institution: Deborah Gross (Professor of Chemistry, Carleton College)

Title: *Observable Reductions in Air Pollutant Emissions during Lockdowns and Isolation Periods due to the Covid-19 Pandemic*

There have been significant changes in the emissions of air pollutants emitted throughout the world due to responses to counteract the spread of the COVID-19 pandemic, such as quarantine, isolation and social distancing. Using the open-source data platform OpenAQ, we gathered emission data for particulate matter (PM_{2.5}, emitted by a variety of natural and anthropogenic sources) and nitrogen dioxide (NO₂, emitted by combustion, including by vehicles), to investigate how emissions are impacted by the preventative measures mandated in multiple US cities. We examined both short and long term emissions datasets to determine if lockdowns and preventative measures had an effect on pollutant emissions. Overall, we found a steady decrease in NO₂ during months of lockdown, however PM_{2.5} emissions were variable with only some decreases during lockdown months. These may be due to several factors such as changes in human activity, economic fluctuations, and policy changes during the pandemic.

This experience was funded by: Carleton Chemistry Department

Live chat from 4:00 - 5:00 p.m.

Irene Stoutland

Class Year: 2021

Major(s): Studio Art, Chemistry

Supervisor(s) and affiliation or institution: Dani Kohen (Professor of Chemistry, Carleton College)

Matt Whited (Associate Professor of Chemistry, Carleton College)

Title: *Computational Investigation of Cobalt Silylene and Related Compounds*

This project aimed to characterize a cobalt silylene (Co=SiR₂) complex, notable for its ability to break the strong carbon-oxygen bond of carbon dioxide (CO₂). This ability is both chemically intriguing and could allow CO₂, a potent greenhouse gas, to be used as a synthetic feedstock after atmospheric capture. We performed quantum chemistry calculations with density functional theory (DFT) to determine the chemical and structural features of the complex essential to its reactivity. We examined whether replacing the silicon or cobalt in the cobalt silylene complex with similar elements would produce a less stable, and more reactive and synthetically useful, product. Using DFT, we investigated the energy landscape of the conformations of the compound as well as charge distribution and bond order, working to identify promising synthetic targets.

This experience was funded by: National Science Foundation CAREER Award (Matt Whited)

Live chat from 5:00 - 6:00 p.m.

Maya Stovall

Class Year: 2023

Major(s): Undecided

Title: *A Virtual Campaign for Todd Lippert*

This summer, I interned on Todd Lippert's reelection campaign for State Representative from my childhood bedroom. Instead of normal in-person events, I spent hours phonebanking, planning social media posts, and connecting with volunteers. I learned how to connect with voters over the phone and how to reach an audience on social media.

This experience was funded by: Jean Phillips Memorial Internship Fund (Career Center)

Live chat from 4:00 - 5:00 p.m.

Lita Theng

Class Year: 2023

Major(s): Undecided

Title: *Internship At Business for a Better World Center (B4BW) George Masson University*

For the period of my summer 2020, I got the opportunity to work with George Mason University Business for a Better World Center (B4BW) where I took part in several projects - some are research-based and others are marketing roles.

For research, I worked on creating a stakeholder value index when accessing big corporations in the US in the efforts of developing a new business course for the business department at GMU. I also worked on a separate research project that looks at the corporate internal and external actions during COVID-19 in the US.

For marketing efforts, I worked on re-branding the center by evaluating and updating the website it had and looking for communication strategies like establishing a consistent newsletter or emailing system for the business center.

I also got to know my supervisors who are experts in their fields of business accounting, business management and consulting and entrepreneurship.

This experience was funded by: Robert E. Will '50 Endowed Internship Fund in Social Entrepreneurship (Career Center)

Live chat from 5:00 - 6:00 p.m.

Drew Thompson

Class Year: 2023

Major(s): Undecided

Title: *Clay County Civil Engineering Internship*

At the Clay County Engineer's Office I had the privilege of working with the County Engineer and other office members on a variety of projects throughout local communities. This internship provided me with a valuable introduction and work experience in the field of civil engineering. I assisted with the development of multiple projects over the course of the summer. These included 4 bridges, culvert replacements, and a concrete/asphalt overlay. I was involved throughout the entirety of these processes- planning, surveying, inspecting, testing, and recording. This taught me a multitude of mathematical calculations as well as some fundamental concepts at the heart of civil engineering. In addition, I learned the community and economic factors taken into account at the county level to ensure people are reaping the most benefits possible from each dollar spent.

This experience was funded by: Trace McCreary '89 and Alissa Reiner Endowed Internship Fund (Career Center)

Live chat from 4:00 - 5:00 p.m.

Aubrey Thurman

Class Year: 2022

Major(s): Economics

Title: *Summer 2020 Infopro Digital Marketing Internship*

During my internship, I translated business presentations and documents from French into English, researched French institutions and other companies, and learned how to send marketing emails to many contacts. My French vocabulary improved, I became better at asking questions, I learned how to use new technology, and I maintained great communication while working remotely.

This experience was funded by: Richard T. Newman Family Endowed Fund for Language Study Internships (Career Center); CGRS; Part of the Paris Internship Program

Live chat from 5:00 - 6:00 p.m.

Chloe Truebenbach

Class Year: 2023

Major(s): Environmental Studies

Title: *Community Organizing with ISAIAH*

In this Social Justice Internship, I spent my summer working remotely for ISAIAH in St. Cloud. ISAIAH is a statewide, multi-faith nonprofit that uses community organizing to push towards racial and economic equity in Minnesota. My supervisor, Christina Nelson, was also in charge of the Willmar area (Kandiyohi County), so I got to experience ISAIAH's voter engagement path in multiple locations. Between turnout for meetings, going to trainings about Race Class Narrative, and attending meetings and participating in discussions, I gained on the ground experience and learned more about organizing with ISAIAH and the general field of community organizing. This internship has set me up with skills necessary in any field, not just community organizing, and it's also introduced me into a new career field that, while I've just barely started, I enjoy immensely.

This experience was funded by: John '55 and Bonnie Raines Endowed Internship Fund (Career Center)

Live chat from 4:00 - 5:00 p.m.

Max Vale

Class Year: 2022

Major(s): Economics

Title: *My Internship at LearningWorks at Blake*

This summer, I worked as a teaching fellow with LearningWorks at Blake. I taught math to 8th grade students from Minneapolis public schools. I learned about what it means to teach in a classroom as a profession, worked to close the opportunity gap in public schools, and developed skills to connect with students in the classroom and over Zoom.

This experience was funded by: Project '60 Endowed Internship Fund (Career Center)

Live chat from 5:00 - 6:00 p.m.

Jed Villanueva

Class Year: 2022

Major(s): Cognitive Science

Supervisor(s) and affiliation or institution: Julia Strand

Title: *Jingle Jangle of LE*

When designing an experiment, selecting and implementing a measure is a difficult decision researchers must face. The results of any given study are directly reliant on the instruments used, so it is imperative that these instruments actually measure what they are supposed to. However, as research on listening effort (the deliberate allocation of mental resources to overcome obstacles in goal pursuit when carrying out a [listening] task" (Pichora-Fuller et al., 2016) has shown, this expectation is uncommon and oftentimes unachieved. In this article, we accomplish two things by describing the current state of listening effort literature in relation to the jingle and jangle fallacies. Then, we provide recommendations, inspired by Flake & Fried (in press), to help researchers improve transparency and evaluate their measure's construct validity. While this paper uses listening effort as an example, the issues and recommendations provided may be applied to other areas in cognitive psychology.

This experience was funded by: National Institutes of Health (Julia Strand)

Live chat from 4:00 - 5:00 p.m.

Mickey Walsh

Class Year: 2022

Major(s): Religion

Title: *CCCCE Internship with Northfield Public Schools Summer BLAST and PLUS Programs*

This summer I worked as a coordinator for Northfield Public Schools Summer BLAST and PLUS programs. BLAST and PLUS offer programs to K-8 Students. In the morning teachers lead programming that includes activities that strengthen reading and math. In the afternoon students have the opportunity to participate in different activities like drawing and playing games. These programs were conducted remotely this year, meaning my main contribution was organizing and distributing over 200 supply bags to students so that they had the supplies to participate in lessons in the morning and activities in the afternoon.

This experience was funded by: The Sam '75 and Meg Woodside (current use) Fund for Career Exploration (Career Center)

Live chat from 5:00 - 6:00 p.m.

Yunping Wang

Class Year: 2022

Major(s): Computer Science, Physics

Supervisor(s) and affiliation or institution: Dr. Robert McLeod(Professor of Electrical, Computer, and Energy Engineering, University of Colorado Boulder)

Title: *Development of a Computational Model for designing High-Efficiency Fresnel Lens Masks*

Fresnel Lens is a type of diffractive optics that is used in applications such as virtual reality setup due to its compactness and adjustability. We developed a beam propagation computational model to improve upon existing mask designs used for creating Gradient-index Fresnel Lenses in photopolymers. One key characteristic of Fresnel Lens is its diffractive efficiency, which determines its effectiveness in application. We explored a range of parameters that have an effect on diffractive efficiency. Our results showed a set of optimal combinations of radius and focal length that will maximize diffractive efficiency while not negatively impacting the focusing ability of the lens. Future studies can utilize these parameters to create Fresnel Lens that will operate better under a broader range of conditions and potentially improve the efficiency and design cost of virtual reality headsets.

This experience was funded by: University of Colorado, Boulder

Live chat from 4:00 - 5:00 p.m.

Lauren Way

Class Year: 2022

Major(s): Chemistry

Title: *Can transition state analogs be used to predict properties of a chemical reaction?*

In collaboration with the Alberg-Hofmeister group, I investigated the desymmetrization reaction of 3-methyl glutaric anhydride. Because similar reactions are synthetically useful, we are interested in understanding how it works. The reaction proceeds with the help of an organocatalyst, which stabilizes the species in between reactants and products, or the transition state (TS). However, the TS is not stable and thus when made in the laboratory it does not last long enough to be studied. In contrast, transition state analogs (TSAs) are stable molecules similar to the TS that will behave similarly experimentally. For this reason, my experimental collaborators synthesized a TSA for this reaction. I used DFT computational methods to simulate the interactions between the catalyst and both the TSA and the TS, with the end goal of better understanding the reaction mechanism. My findings so far suggest that the application of computational chemistry to this investigation is promising.

This experience was funded by: The Donors of the American Chemical Society Petroleum Research Fund (Gretchen Hofmeister)

Live chat from 5:00 - 6:00 p.m.

Thomas White

Class Year: 2022

Major(s): American Studies

Title: *Indigenous Studies Research Assistant at the University of Kansas*

This summer I assisted Professor Sarah Deer of the University of Kansas with research in the field of Indigenous Studies. Our primary project was an academic article concerning the biased framing of the Indian Child Welfare Act (ICWA) in newspaper editorials. ICWA, a 1978 law passed by the U.S. Congress, attempts to eliminate the disproportionate removal of Native children from their communities and into white families but has generated opposition from right-wing adoption advocates. Our article deconstructs the racist, colonial ideology embedded within many arguments against the bill. My other major project was a statutory analysis of certain tribal codes in light of the ruling of the Supreme Court case *McGirt v. Oklahoma*. Throughout the summer I refined many important skills, such as academic writing, database research, and use of Microsoft Excel, as well as opened my eyes to law school as a possible career path.

This experience was funded by: American Studies Grant

Live chat from 4:00 - 5:00 p.m.

Benjamin Wightman

Class Year: 2021

Major(s): History

Title: *A Paragon of Virtue: Conceptions of Imperial Authority in Fourteenth-Century Japan*

The Emperor of Japan has been regarded as a mere figurehead for much of the country's history. Yet even when the emperor's de facto power was severely limited, he was thought to possess certain powers. This project analyzes what was expected of the role of a Japanese emperor in the fourteenth century. It centers around the figure of Emperor Go-Daigo, who briefly restored the imperial institution to full sovereignty in the Kenmu Restoration of 1333-1336. The conflict between the emperor and his primary opponents in the military aristocracy prompted many contemporary writers to theorize on the powers that the emperor should possess, creating literary works that are excellent for analysis in this project. The main sources used are the *Jinnō Shōtōki* of Kitabatake Chikafusa, one of Go-Daigo's main advisors, various works of Emperor Hanazono, who wrote prolifically on the topic of imperial power, and the epic the *Taiheiki*.

This experience was funded by: Roy Grow Fellowship

Live chat from 5:00 - 6:00 p.m.

Claire Williams

Class Year: 2021

Major(s): Physics

Supervisor(s) and affiliation or institution: Salvatore Vitale (Assistant Professor of Physics, Massachusetts Institute of Technology), Maximiliano Isi (NASA Einstein Fellow, Massachusetts Institute of Technology), Sylvia Biscoveanu (Graduate Student, Massachusetts Institute of Technology)

Title: *Can LIGO Detect Gravitational-Wave Signals with Large Violations of General Relativity?*

Testing the theory of general relativity (GR) is a central science objective of the Laser Interferometer Gravitational-Wave Observatory (LIGO). This work is motivated by concerns that LIGO's search algorithms would be unable to detect GR-violating signals because they compare observational data to theoretical waveforms that assume GR. We test the ability of one of these algorithms to identify simulated binary black hole merger waveforms containing various deviations away from GR. Outside of a small range where deviations are small, signals with a variety of deviations over a range of masses are found to have a significant drop in fit with the search's set of GR waveforms. The results suggest that LIGO's constraints on these deviations may apply to a smaller region of parameter space than previously believed, and that a significantly GR-violating event may be undetectable to this search.

This experience was funded by: Kolenkow-Reitz Fund (STEM Board)

Live chat from 4:00 - 5:00 p.m.

Jan Williams

Class Year: 2022

Major(s): Physics

Supervisor(s) and affiliation or institution: Jay Tasson, Carleton College

Title: *Ring Laser Gyroscopes for Tests of Lorentz Violation*

Both General Relativity and the Standard Model of particle physics, which currently provide the best description of known phenomena, demand that physics is Lorentz invariant. That is, the laws of physics are invariant under boosts and rotations. The Standard Model Extension provides a systematic framework to investigate possible Lorentz invariance violations by ascribing violations to various coefficients that are added to known physics. Earth based ring laser gyroscopes are sensitive instruments that currently make high-precision measurements of Earth's rotation rate and may soon observe the effects of General Relativity in new ways. They can also be used to set experimental limits on the magnitude of Lorentz-violating coefficients. Using data from the G-Ring located in Bavaria, we obtain preliminary sensitivities that appear to be competitive with the best previous measurements from other types of experiments.

This experience was funded by: Towsley Endowment for the Sciences (STEM Board)

Live chat from 5:00 - 6:00 p.m.

Benjamin Willmore

Class Year: 2022

Major(s): French and Francophone Studies

Title: *Perceptions of Race Between France and the United States*

I interned "in Paris" (via Zoom) at La Ligue des droits de l'Homme, a French NGO focusing on a variety of human rights issues. Specifically, I conducted research comparing police violence in the United States and in France which eventually evolved into a research project looking at racial perceptions in both countries and finally, a comparison between American individualism and French universalism. I examined examples such as the role of the Black Lives Matter movement in France compared to the US and differences in the expression of religion in public between the two countries.

This experience was funded by: Elizabeth and George Frost Endowed Internship Fund (Career Center); and Center for Global and Regional Studies; Part of the Paris Program

Live chat from 4:00 - 5:00 p.m.

Ian Wojtowicz

Class Year: 2023

Major(s): Undecided

Title: *Comparing Veto Algorithms for Gravitational Waves*

The detection of gravitational waves, gravitational interaction's analogue of light, rely on highly sensitive measurements with giant instruments. Background noise, such as seismic vibration, is common in gravitational wave data, and thus needs to be removed through the application of noise characterization algorithms. Two common algorithms are Used Percentage Veto (UPV) and Hierarchical Veto (hVeto), but little is known about their respective advantages. To explore this, we ran both algorithms with similar configuration parameters on a week-long data set from the Hanford interferometer site. Preliminary results suggest that hVeto has a higher efficiency in identifying noise, but is much less selective in what it chooses to veto as noise than UPV. Through further interpretation of our data, we hope to make recommendations that will allow UPV and hVeto to capitalize on their strengths and increase their performance in noise identification for gravitational wave analysis.

This experience was funded by: Towsley Endowment for the Sciences (STEM Board)

Live chat from 5:00 - 6:00 p.m.

Beck Woollen

Class Year: 2023

Major(s): Undecided

Other Authors/Contributors: Bjorn Holtey

Supervisor(s) and affiliation or institution: Barbara Allen (Professor of Political Science)

Max Lane '19

Title: *Televised News Ownership and Election Coverage in the Upper Midwest*

News platforms are becoming increasingly diverse, but televised news is still dominant (Shearer 2018). The differing agendas of national television stations have contributed to increased polarization seen in the 2016 election cycle (Hyun and Moon 2016). This research examines the potential of local televised news channels to have a similar impact. Based on roughly 1,000 annotated news transcripts, this project highlights trends discovered within the 2008 and 2016 election seasons and differences between them. Our research analyzes the channels' candidate portrayals, framing, and issue and advertisement coverage. We are continuing this research in an independent studies course this fall.

This experience was funded by: Humanities Center and Dean of the College Office

Live chat from 4:00 - 5:00 p.m.

Xinyan Xiang

Class Year: 2022

Major(s): Physics

Supervisor(s) and affiliation or institution: Chris West (Visiting Assistant Professor of Physics, Physics and Astronomy, Carleton College)

Title: *Weak S-Process Nucleosynthesis in Massive Stars*

The weak s-process occurs in massive stars with $M \geq 13M_{\odot}$ during convective core He burning and shell C burning, and synthesizes stable isotopes up to a mass of $A \approx 100$. A previous study solved differential equations for the weak s-process abundances numerically, and found a linear combination of five neutron exposures that produced the desired s-only isotopic abundances as residuals from the solar abundances for ^{70}Ge , ^{80}Kr , and ^{86}Sr , but under-produced the remaining s-only isotopes, ^{76}Se , ^{82}Kr , and ^{87}Sr . In this study, we adopted a linear combination of exponential distributions of neutron exposures with the corresponding fraction f of ^{56}Fe seed nuclei and characteristic neutron exposure τ_0 as fit parameters. This method reflects the physical assumptions of decreased probabilities for increasing neutron exposures and of different sites having different characteristic neutron exposures. Preliminary results for a single distribution are promising, with close fits for three s-only isotopes using $\tau_0 = 0.0501$ and $f = 0.096$. Future inclusion of additional distributions and testing with stellar models are forthcoming.

This experience was funded by: Ford Fund (Physics and Astronomy Department)

Live chat from 5:00 - 6:00 p.m.

Jaren Yaming

Class Year: 2022

Major(s): Geology

Supervisor(s) and affiliation or institution: Nathalie Goodkin (American Museum of Natural History)

Title: *Investigation of the Long-Term Stability of the NAO SST Tripole*

The North Atlantic Oscillation (NAO) is a measure of the pressure difference between Iceland and the Azores and impacts weather patterns from the Eastern US to Western Europe. Correlations between winter sea surface

temperature (SST) and the NAO reveals a tripole pattern of positive correlation in the subtropical Atlantic sandwiched between subpolar and tropical areas of negative correlation. Coral skeletons are important paleoclimatological archives, with coral Sr/Ca ratios inversely correlating to SST.

However, how temporally robust is the correlation between winter SST and the NAO? This study investigates the stationarity of the SST tripole with four monthly winter Sr/Ca records from Bermuda, Dry Tortugas, Little Cayman, and Guadeloupe. Located along the positive to negative North-South correlation gradient. Comparing correlations of the Sr/Ca and instrumental NAO records through time shows shifting of the null zone of the NAO SST tripole across the Caribbean which may imply shifting stationarity through time.

This experience was funded by: American Museum of Natural History

Live chat from 4:00 - 5:00 p.m.

Jill Yanai

Class Year: 2022

Major(s): Music, Sociology/Anthropology

Title: *Three Baul Musicians' Perspectives of COVID-19 in West Bengal, India*

The Baul musicians of West Bengal are a highly diverse group of performers and spiritual practitioners who, in the last six months, have undergone unprecedented financial insecurity brought about by the COVID-19 pandemic. My research focuses on an interview with three Baul musicians, provided by my internship at the Smithsonian Center for Folklife and Cultural Heritage (CFCH), which analyzes the impact of COVID-19 on their economic, spiritual, and social livelihoods. National restrictions on tourism, interlocal travel, and social gatherings have rendered traditional means of income of folk artists like the Bauls obsolete, leaving musicians without an economic safety net. Diving into their perspectives and emphasizing their agency, I ask how these musicians secure new financial opportunities in a virtual world. How is the Baul tradition challenged, redefined, and sustained during times of crisis? Through this research, I endeavor to gain a deeper understanding of the relationship between indigenous music and such crises as pandemics.

This experience was funded by: Mellon Mays Undergraduate Fellowship

Live chat from 4:00 - 5:00 p.m.

Taylor Yeracaris

Class Year: 2020

Major(s): Mathematics, Japanese

Title: *Pine Ridge Reservation Internship*

This summer, I worked with a Lakota language immersion program at Thunder Valley school in Pine Ridge, SD. Although the internship was remote, I still learned a lot about the Lakota language and culture, as well as about curriculum creation, e-learning platforms, and Kindergarten math education. The main focus of my time was creating interactive e-learning materials for Kindergarten math (in Lakota). I will be continuing work for the school as a contractor to finish the project.

This experience was funded by: Social Justice Internship Fund

Live chat from 4:00 - 5:00 p.m.

Skylar Yu

Class Year: 2021

Major(s): Psychology

Supervisor(s) and affiliation or institution: Dr. Ruonan Jia (Yale University)

Title: *Decision Making under Uncertainty*

We make decisions every day, and mostly we make decisions under uncertainty. Brain regions like ventromedial prefrontal cortex and striatum have been implicated in the neurobiology of decision making. Gambling task is used a lot in traditional decision-making research. The lab conducted a study to compare monetary and medical decision making among physicians. We started to analyze the brain image data of that study this summer. We also started to develop a social decision making paradigm, in order to provide a more ecologically valid context for the decision-making process. The new paradigm is a decision-based game, in which a participant becomes a new resident to a town, aiming to maximize popularity through social interaction with other town residents. We would like to see whether social decision-making shares the same neural circuits with monetary decision-making, and how participants solve ambiguity under certain motivation.

This experience was funded by: Dr. Ruonan Jia (Yale University); Career Center Internship Fund

Live chat from 4:00 - 5:00 p.m.

Hannah Zhukovsky

Class Year: 2021

Major(s): History

Other Authors/Contributors: Marcella Lees

Title: *Public History Internship*

We worked on a number of public history projects for Carleton College and the surrounding area working especially with the Rice County Historical Society, the Minnesota School for the Blind, and the Carleton Covid-19 archive. We both worked on a project for the MSAB helping to secure a grant to digitize a set of class photos spanning back over the past 80 years. We also processed these photos and collected all the necessary metadata. Hannah also worked on processing a set of photos for the RCHS as well as some archival work and Marcella worked on curating an exhibit for the Covid-19 archive and doing data organization for the MSAB.

This experience was funded by: CCCE

Live chat from 5:00 - 6:00 p.m.

Christof Zweifel

Class Year: 2021

Major(s): Chemistry

Supervisor(s) and affiliation or institution: Dani Kohen (Professor of Chemistry, Carleton College)

Title: *Molecular Insight into Cation Motion within the MFI Zeolite*

Zeolites are microporous aluminosilicate minerals. A network of pores permeates the bulk of the zeolite much like a sponge, which gives the zeolite a large internal surface area to volume ratio. A large surface area makes zeolites ideal for gas adsorption. Within the zeolite, cations that are detached from the structural framework explore the pore channels using thermal energy for motion. These extra-framework cations have the potential to interact with gas molecules and create selective adsorption within the pores. We used computer simulations, in particular ab initio molecular dynamics, to recreate the movement of cations within the zeolites and identify the sites where cations spend most of their time. I wrote code to analyze the coordinates of every atom over the course of the simulation and used my chemistry knowledge to identify important conditions, variables, and experimental questions through the lens of computational chemistry.

This experience was funded by: National Science Foundation RUI (Dani Kohen)

Live chat from 5:00 - 6:00 p.m.