Congratulations to our incoming 2020-2021 Rebel Research and Mentorship Program Graduate Student Mentors

UNLV | GRADUATE COLLEGE

College of Education

UNLV | GRADUATE COLLEGE

HEATHER THOMPSON

Ph.D. Student

Department of Counselor Education, School Psychology, and Human Services

Faculty Advisor: Dr. Samuel Song

My research interest is related to restorative justice (RJ) practices which can be described as a way to support accountability for student behavior with a focus on repairing harm rather than using zero-tolerance discipline policies that have shown to be ineffective. Zero-tolerance discipline policies are one factor related to the disproportionality in discipline that ultimately contribute to the school-to-prison pipeline. RJ needs to be critically examined as an intervention to understand its effectiveness in the school setting. My research team, advised by Dr. Samuel Song, partners with CCSD to evaluate the effectiveness of RJ practices in schools. My project will focus on the implementation science of RJ. An undergraduate student might participate in various aspects of the research process to include literature reviews, data collection, data analysis, and dissemination of the results at a local or national conference. An undergraduate student might also have an opportunity to co-author a manuscript.

ANDROMEDA HIGHTOWER

Ph.D. student, Department of Teaching & Learning

Advisor:
Dr. Peter Wiens

Do you like video games?
Do you think learning with games in the classroom can be fun and educational?

It's possible, but there's still much we need to understand about game-based learning and how to best prepare teachers for the exciting possibilities of using digital games in the classroom. This project will involve conducting a workshop with teachers using Minecraft: Education Edition.

As a critical member of the project, you will be involved at each step of the research:

- reading and collecting literature and discussing findings as a team
- assisting with workshop planning
- learning and playtesting Minecraft: Education Edition
- participant observing teachers in the workshop
- assisting with data analysis, quantitative and qualitative
- contributing to the writing of the manuscript
- co-presenting the research at an academic conference.

College of Fine Arts

UNLV | GRADUATE COLLEGE

BRIAN HOLLANDER

M.F.A. student, Department of Theatre Arts

Faculty Advisor: Judith Ryerson

This creative project will be to research and design period and cultural appropriate costumes for a theatre stage show. This consists of implementing a creative, unique, and cohesive design that tells a story for all the characters within the show. During this process we will also be collaborating with faculty, staff, and a design team to ensure all the design elements work together and functions as a cohesive unit.

Specific responsibilities for both myself and the undergraduate student mentee will be to research the historic period, create and construct costumes which consists of purchasing, altering, resizing and revamping existing costume pieces. During this design process we will also develop costume, hair, and makeup plots; conduct fittings; and create patterns to fit design specifications. We will also be developing a PowerPoint design presentation and the show will also be produced on stage here at UNLV with the Nevada Conservatory Theatre.

LAURENCE MYERS REESE

M.F.A. student, Department of Art

Faculty Advisor: Alisha Kerlin, Executive Director, Barrick Museum of Art

The undergraduate student and I will develop an exhibition in the Barrick Museum of Art's Work Shop gallery space, drawing on the Barrick's collection and artists from the community, and create public programming for the UNLV community.

The student will learn the process of creating a museum exhibition from conception to finish. They will learn concrete skills, gain resources, and develop creative problem-solving. Skills learned include artist communication, writing development, learning about museum administration, art handling, preparatory work and installation, marketing, and more.

Graduate College

UNLV | GRADUATE COLLEGE

CHARLI AGUILAR

I.H.S. Ph.D. Candidate, Interdisciplinary Health Sciences

Advisor: Dr. Graham R. McGinnis

Circadian variation in sensitivity to Hypoxia

Circadian rhythms are physiological and metabolic changes in all living organisms that follow a daily cycle. Hypoxia (lower levels of oxygen in the air) affects people when traveling to altitude or using commercially available tools to simulate altitude. This investigation seeks to understand how the time-of-day an individual is exposed to hypoxia may influence how their body reacts to it.

Participants of this study will be exposed to hypoxia in the morning and the evening. Blood samples will be collected and analyzed in our lab. Findings from this investigation could inform individuals of important time frames of opportunity (to elicit benefits) or time frames of vulnerability to hypoxia.

An undergraduate mentee would be essential to collection of data, sample processing, and lab tests. They would also be able to participate in manuscript writing. I would encourage a mentee to review literature as well.

RACHEL ALI RODRIGUEZ

Ph.D. student, Neuroscience

Faculty Advisor: Rochelle Hines

Epilepsy results from excessive firing of neurons. A key site in the control of neuronal activity patterns is the axon initial segment (AIS). It remains to be determined how the morphology and composition of the AIS is affected in epilepsy.

We will analyze AIS morphology including length, width, tortuosity, and periodicity though development. Our mentee will learn Golgi stain analysis on the confocal microscope, immunohistochemistry, laser scanning microscopy, and data analysis. He/she will also gain experience from transcardial perfusions, tissue collection, and animal husbandry.

This project will give us understanding of the functional implications of AIS morphology and organization, providing new insight needed to develop therapies to control neuronal signaling.

Howard R. Hughes College of Engineering

UNLV | GRADUATE COLLEGE

GEORGE WILLIAM KAJJUMBA

Ph.D. student, Civil and Environmental Engineering & Construction

Advisor:
Dr. Erica J. Marti

Background: Water is a cardinal pillar of life; without it, life is impossible. However, if it is not managed well, it is a conduit for contaminants/diseases that have affected us for centuries. Our current project focuses on advancing water reuse and treatment—a solution to billions of people living in water polluted areas and water scarce environments like Las Vegas

Why work with us? If you enjoy hands-on work in a laboratory with water/chemicals, have patience to work methodically through a procedure, and like to challenge yourself, then this is the project for you. The research experience will allow you to understand better how to design solutions for communities, determine an area of interest, and jump-start your careers as a researcher and/or prepare you for graduate school.

Roles: (1)Perform a literature review to modify the proposed study plan, (2)Set up experiments, (3)Collect and analyze data, and (4)Draft report and/or journal article.

YASAMAN SAEDI

Ph.D. student, Department of Civil and Environmental Engineering

Faculty Advisor: Dr. Jacimaria Batista

Perchlorate (ClO_4^-) has been detected in groundwater and soil systems throughout the United States for the last two decades. This contaminant is known to block iodine uptake by the thyroid gland. Perchlorate biodegradation has been successfully observed in low saline areas While the feasibility of biodegradation in high saline area using natural occurring bacteria has not been documented well.

Purpose: isolate, identify, and characterize perchlorate reducing bacteria in high saline area to degrade perchlorate.

The undergraduate mentee will be supposed to conduct the following tasks:

- Conduct literature survey on salt tolerant bacteria and perchlorate biodegradation.
- Help to set-up the experimental design.
- Help to sort data which will be obtained from the experiments.
- Write a short technical report on what she/he will conduct during one-year research.

SURAJ VENKAT POCHAMPALLY

Ph.D. Student,
Mechanical Engineering

Advisor:
Dr. Jaeyun Moon

PROJECT DESCRIPTION:

We will study the surface interaction between carbon-based porous materials and toxic pollutants soluble in water, resulting in the development of new efficient remediation processes and materials for groundwater recovery, especially at the Department of Energy (DOE) nuclear sites. In this project, we will produce biochar (carbon-based porous matter) from biomass feedstocks, subsequently to modify the biochars to enhance their sorption capability, and finally to use it for effective purification of groundwater from toxic pollutants. My undergraduate mentee will be helping with the material characterization on Scanning Electron Microscopy (SEM) and performing some tests like the contact angle measurement test. They will also do a literature review on new materials and methods which support the project.

School of Integrated Health Sciences

UNLV | GRADUATE COLLEGE

ANDREW ORTIZ

Ph.D. student, Department of Brain Health

Faculty Advisor: Dr. Jefferson Kinney

Alzheimer's disease is a neurodegenerative disease that is characterized by progressive synaptic and neuronal cell death, learning and memory deficits, and overall cognitive decline. There are several genetic and non-genetic risk factors that substantially increase the likelihood of developing Alzheimer's disease. One of the largest is Type II diabetes, which can confer up to a 4-fold increase in developing the Alzheimer's disease. Additionally, a surprising 80% of all Alzheimer's disease patients have Type II diabetes, or some degree of insulin resistance/glucose intolerance.

My research aims to investigate the overlapping mechanism between these two devastating modalities. Specifically, I am interested on how glial cells and a chronic immune response in the brain play a role in Type II diabetes and Alzheimer's disease.

Undergraduate mentee:

- Semi-quantify proteins levels via western blotting & immunohistochemistry.
- Analyze and interpret data
- Gain fundamental research experience and skills that will prepare them for graduate school.

MILAN PANTOVIC

Ph.D. student, Department of Kinesiology and Nutrition Sciences

Faculty Advisor: Dr. Brach Poston

Bimanual actions are required to accomplish numerous activities of daily living. Aging and neurological disorders can cause impairment of bimanual skills, such as eating, dressing, and typing. Typing skills in particular have become a highly important bimanual activity in everyday life and workplace.

One possibility for improving typing skills might be the use of a non-invasive electrical brain stimulation technique known as transcranial direct current stimulation (tDCS) during typing activities. This technique can modulate brain excitability and improve motor learning and performance in both healthy and clinical populations.

The RAMP Program will provide an opportunity for an undergraduate student to learn the latest techniques in the fields of human motor control and learning. In addition, obtaining research experience and publishing a paper while an undergraduate will greatly aid the student in obtaining future career goals.

College of Liberal Arts

UNLV | GRADUATE COLLEGE

ELIZABETH JOHNSON

Ph.D. student, Anthropology

Advisor:
Dr. Peter Gray

Cats are not just today's fuzzy overlords of the Internet. According to the Humane Society of the United States, they are also the most popular companion animal in the US (2019): some 86 million cats live in 39 million American households. Yet we are still learning about the roles of cats in Americans' lives. My study aims to examine the potential benefits that women derive from their cats, specifically, whether women's salivary oxytocin (OT) levels increase during after-work interactions with their cat compared to a control condition.

Participants are asked a series of demographic questions designed to describe their current living arrangements, income and relationship with their cat. Cat interventions are recorded via a video file, so that data can be synchronized with survey materials. It is my hope that an undergraduate mentee is able to gain an understanding of tools and techniques to decipher the collected data into results.

DANIEL PEREZ

Ph.D. candidate, Anthropology

Adviser: Karen G. Harry, Ph.D.

The title of my project is “An Experimental Understanding of Virgin Branch Puebloan Subsistence through Ground Stone Technology”. This research is an experimental archaeological undertaking in which late prehistoric subsistence strategies are considered through the analysis of ground stone technology (e.g., manos, metates), associated use-wear patterns with cultivated and wild food resources (e.g., corn, pine nuts, sunflower seeds), and the processing of non-food products (e.g., animal hides). The focus of this project will be on discerning use-wear patterns applicable to both interpreting the archaeological record as well as answering larger questions of subsistence strategies through indirect methods of archaeological inference.

The likely role of the mentee for this project will involve: (1) reading select, relevant journal articles; (2) collaborating in research design; (3) processing various materials using experimental ground stone tools; (4) analyzing and understanding different use-wear patterns on ground stone tools; and (5) co-presenting a conference research poster.

ALDO BARRITA

Ph.D. student, Department of Psychology

Advisor:
Dr. Gloria Wong-Padoongpatt

My research project will study how forms of micro racism—racial microaggressions impact marginalized individuals. Specifically, we are interested in the response to these attacks in the form of stress and the coping mechanisms involved in this process. My mentee will be managing data collection and trained in statistical analysis for this study. Additionally, my mentee will collaborate in poster development and presentation at a national conference, as well as assisting on writing the manuscript for publication.

KARLI NAVE

PhD Student, Department of Psychology

Advisors:
Dr. Erin Hannon, Dr. Joel Snyder

Prior research has suggested that human's brain activity *entrains* to the rhythm that they perceive in an auditory stimulus. Prior work has also suggested that rhythm perception abilities can be predictive of language abilities in children. However, to date no one has examined whether children show this same rhythm-related brain activity, or whether it is predictive of language abilities.

In the current study, Karli and her mentee will use electroencephalography (EEG) to non-invasively measure children's brain activity while they complete a musical beat perception game. They will also measure children's phonology and reading skills to estimate the relation between rhythm perception and language development.

The mentee for this project will:

- Recruit participants
- Learn how to collect EEG data
- Learn how to process & interpret EEG data
- Present at the OUR research forum
- Present at an academic conference (w/ Karli)
- Have the opportunity to contribute to a manuscript for publication.

As an advocate for open science practices, Karli has pre-registered this project on OSF, which you can access here: https://osf.io/4rcjh.

CELENE FULLER

Ph.D. student, Sociology

Advisor: Barbara Brents

This project involves working with the non-profit organization NARAL Nevada to examine barriers to abortion access in the state of Nevada. I will conduct in-depth interviews with staff and providers at abortion clinics in Nevada. This primary interview data will be combined with secondary data including abortion rates, access to healthcare in the state, socioeconomic status of abortion patients, and other local trends over time relative to the national average. The mentee and I will work together to transcribe and qualitatively analyze the interviews in addition to conducting and interpreting statistical analyses of secondary data.

BRIDGET LONGORIA

Doctoral Candidate, Sociology

Advisor:
Simon Gottschalk, Ph.D.

Potential undergraduates would assist on my ethnographic study of a nonprofit social service agency looking at the interplay between cultural discourses, organizational framing, and interaction. This study focuses on the interaction between and amongst providers and recipients while considering how macro and meso level forces influence the implicit (and sometimes explicit) interpersonal negotiations that occur between actors in the setting. I am interested in how these negotiations influence both clients' abilities to access needed services and providers' efficiency in providing them. The student will help transcribe interviews and analyze multiple points of data. They will also potentially coauthor a manuscript to present at a sociology conference where I will show them how to network with a diverse group of scholars across the discipline.

School of Life Sciences

UNLV | GRADUATE COLLEGE

LORENA SAMENTAR

Ph.D. candidate, School of Life Sciences

Advisor:
Dr. Nora B. Caberoy

My research project is on the development of a novel therapy for Alzheimer's disease. We are testing the hybrid protein that we have engineered both in cellular and mouse models. Thus far, our results are promising and we are excited to be on this race towards the development of an Alzheimer's therapy.

My undergraduate mentee will be trained on the basic techniques and concepts of cell and molecular biology from bacterial transformation, plasmid purification, PCR and cloning, Western blot, and cell culture. Opportunities to apply these technical skills in doing a focused study on the interaction of two proteins that might have implications in neurodegeneration will be provided. I hope that my journey with my mentee will lead to a strong grasp of basic molecular biology research, a poster or oral presentation, a co-authorship in a publication, and more importantly, a greater passion and appreciation of doing science.

ANNE VILLACASTIN

Ph.D. Student, School of Life Sciences

Advisor: Dr. Jeffery Shen

My study involves developing biotechnological tools that improve the cultivation of rice – a globally important crop that feeds 70% of our world's population. I do this by identifying important genes in rice that would allow production of higher yielding varieties despite pressures from environmental stress. The end goal of this project is to contribute to global efforts against food insecurity.

My undergraduate research mentee will be equipped with hands-on knowledge in performing plant stress assays, implementing molecular techniques to assess gene and protein expression levels, and using bioinformatics to elucidate the mechanisms by which our genes of interest control how rice responds to abiotic stress.

I am passionate about my project and would like to share that with an undergraduate who holds the same interest in scientific research. I hope to encourage my mentee to form a deeper understanding of and appreciation for the scientific method and efficient data dissemination.

College of Sciences

UNLV | GRADUATE COLLEGE

CHANDLER HASSAN

Ph.D. student, Department of Chemistry & Biochemistry

Advisor:
Dr. Ernesto Abel-Santos

My research project, “Effects of Spore Calcium and Dipicolinic Acid on *Bacillus anthracis* Virulence,” seeks to examine which factors contribute to the lethality of anthrax infections. The goal of the project is to elucidate new understanding of the mechanisms used by *B. anthracis* to thwart our immune systems and cause disease.

The project relies on a unique combination of traditional *ex vivo* and modern *in vivo* techniques from several biological and chemical disciplines in order to answer our research questions. The undergraduate student mentee will be responsible for assisting on all parts of the project: culturing and sporulating *B. anthracis*, culturing mammalian cells, performing spore germination and cell viability assays, sample analysis via inductively coupled plasma spectroscopy, molecular cloning and transformations.

ELIZABETH MONROE

Ph.D. Student, Department of Chemistry

Advisor:
Dr. Cory Rusinek

My research project will focus on developing a tool for the assessment of oxidative stress, namely the detection of hydrogen peroxide (H2O2) and peroxynitrite (ONOO-). Finding a practical and efficient way to study oxidative stress would grant us a deeper understanding of several neurodegenerative diseases as well as age-related cancers. Electrochemistry is a multi-disciplinary field that offers inexpensive analytical methods with the sensitivity we require. The undergraduate mentee and I will characterize different types of electrode materials to find one which can provide the required characteristics in the detection of H2O2 and ONOO-. We will also compare our electrochemical results with those obtained with conventional spectroscopic techniques. The goal of this collaborative research will be to generate a peer-reviewed research article as well as to present in the society for electroanalytical chemistry (SEAC) student session.

CHRISTOPHER DEFELICE

Ph.D Candidate
Dept. of Geoscience

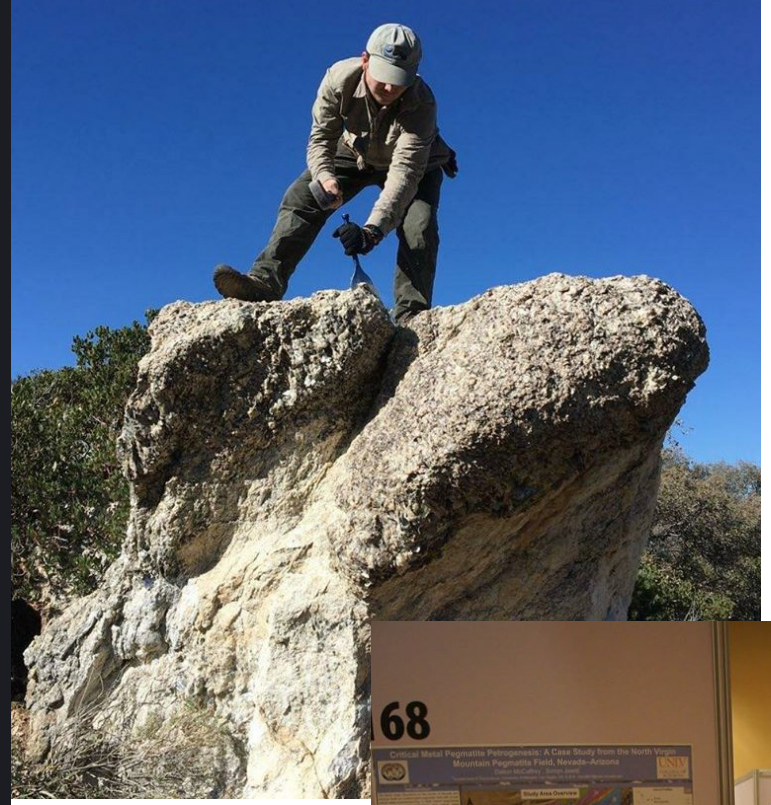
Advisor:
Dr. Shichun Huang

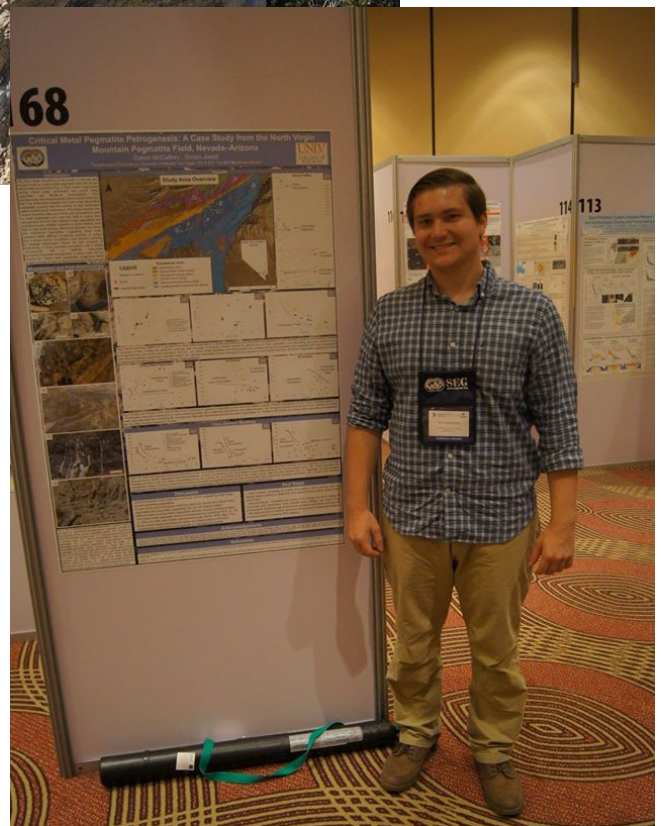
Our project will be investigating how Hawaiian volcanoes change chemically over time. Hawaiian volcanoes are some of the most well studied volcanoes on the planet, because they are thought to be sourced in the deep Earth, somewhere in the mantle. These volcanoes are a rare window into the inner Earth, allowing us to figure out how the planet has evolved over time. We will use wet chemical analysis in the Las Vegas Isotope Science lab's clean room to digest rock samples and analyze them for their major and trace element abundances. Roles will include working in a chemistry lab, cleaning labwares and preparing samples, and learning how to operate an inductively coupled plasma mass spectrometer.

DALTON MCCAFFREY

Ph.D. student, Department of Geosciences

Advisor:
Dr. Simon Jowitt





U-Pb Dating of Rare Metal Granitic Pegmatites in the Virgin Mountains, NV

Granitic pegmatites are important resources for many rare metals (e.g., Nb, Be) used in modern, green, and military technologies. However, these geologic systems are poorly understood. This study uses U-Pb dating of zircon, a common mineral in pegmatites, in the Virgin Mountains of Nevada to constrain the timing of intrusion of these magmas and their relationship with granites in the area. Understanding this would provide insight into the formation of these unique geologic systems, whether related to a specific geologic event or multiple events.

The job of the mentee would be to aid in field work (sampling, geologic mapping), sample preparation (rock crushing and sifting), mineral separation, and possible assistance with Laser-Ablation-Inductively-Coupled-Plasma-Mass-Spectrometry. Once analysis is complete, the mentee will also be taught how to build figures and make interpretations for this data.