2015-2016 Nevada Space Grant Scholarship Recipients

CONGRATULATIONS

2015-2016 SPACE GRANT SCHOLARS

Sierra Adibi
Multi Aircraft Simulator Project

UNIVERSITY OF NEVADA, RENO
Mechanical Engineering

Michael Briones
Identification of a germination receptor of the hyper-virulent strain of Clostridium difficile through natural mutagenesis

UNIVERSITY OF NEVADA, LAS VEGAS
Biological Sciences

Chrisabelle Cempron
Incomplete Denitrification in Thermus Species from Yunnan Province, China

UNIVERSITY OF NEVADA, LAS VEGAS
Microbiology

Carolyn Chang
Characterization of a novel species of Hydrogeno-bacter that is abundant in geothermal springs in Tengchong, China

UNIVERSITY OF NEVADA, LAS VEGAS
Biology

Ariel Friel
Tectonic and climatic forcing of hydrological systems in the southern Great Basin: Implications for ancient and future aquatic system resilience

UNIVERSITY OF NEVADA, LAS VEGAS
Microbiology

Armon Latifi
Effective Power Management of Harvested Power on Small Unmanned Aerial Vehicles

UNIVERSITY OF NEVADA, LAS VEGAS
Electrical and Computer Engineering

Grant Mercer
Developing a Data Visualization Tool for CALIPSO Satellite Aerosol Data

UNIVERSITY OF NEVADA, LAS VEGAS
Computer Science

Alex Rollings
Characterizing Topological Dark Matter Through Pow-er Spectral Density

UNIVERSITY OF NEVADA, RENO
Physics

Sarah Thornton
CsSnI3 As a Photocathode Material

UNIVERSITY OF NEVADA, LAS VEGAS
Mechanical Engineering

Nevada NASA Space Grant Consortium
Since 1991

ABOUT THE NEVADA SPACE GRANT
RISE & HOP SCHOLARSHIP OPPORTUNITY

The Research in Science & Engineering and Hands on Projects (RISE & HOP) Scholarship Opportunity provides STEM students with $5,000 in scholarship support for the 2015-2016 academic year. Awardees must conduct a STEM research or a hands on project under the guidance of a faculty mentor.

Students engaged in any STEM area were encouraged to apply, however fields specifically related to unmanned aerial systems, aeronautics (including high altitude balloon projects), planetary geology, astrochemistry, astrophysics, astrobiology, biodiversity/biology, new satellite data systems, remote sensing, sustainability, agricultural science, climate change, hydrological impacts under a changing climate, and STEM education were of particular interest.

Students are encouraged to participate in undergraduate and graduate research symposiums, poster sessions and oral presentations regarding their research/ project.

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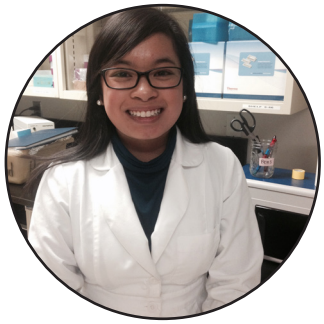
Sierra Adibi is in her senior year at the University of Nevada, Reno, where she is studying Mechanical Engineering. Sierra is highly involved with the aerospace organizations on campus, acting as the President of UNR's Chapter of the American Institute of Aeronautics and Astronautics. In the fall of 2016 Sierra plans to begin her doctoral work in Aerospace Engineering, focusing on dynamics and control systems. Sierra's long-term aspiration is to become a professor of engineering, where she can share her love for STEM and conduct research to develop UAVs capable of delivering vital relief supplies to conflict and disaster zones.

For the RISE/HOP project, Sierra is designing and building a functional physics and aerodynamics simulator. The simulator will be capable of handling multiple aircraft and interacting with other types of algorithms. The simulator will then be used in conjunction with other algorithms to redefine the capabilities of small UAVs and study aircraft interaction when multiple systems are in flight.

Michael Briones: I am a senior at UNLV majoring in Biological Sciences and hope to graduate this coming Spring of 2016. I currently perform research in the laboratory of biochemistry professor Dr. Ernesto Abel-Santos. My research focuses on understanding the mechanisms involved in spore germination of the bacterial species Clostridum difficile, a bacterium associated with many infections acquired in hospitals. The focus of my project this year is to identify a key gene that is associated with the virulence of C. difficile. The identity of this gene will allow rational development of drugs that target this pathogen to preventing infection. After I graduate, I hope to be enrolled in a dual doctorate and medical degree program (MD/PhD). I aspire to become a physician-scientist with a career investigating infectious diseases.



Chrisabelle Cempron is pursuing a Master's degree in microbial ecology and later hopes to earn a Ph.D in microbiology. Her research focuses on denitrification in high-temperature geothermal environments. Complete denitrification is the process by which nitrate is reduced to dinitrogen gas (N2). Microbial production of nitrous oxide (N2O) in hot spring systems through truncated denitrification pathways is a significant source of global greenhouse gas emissions. Her work aims untangle the impacts of gene transfer on the evolution of denitrification genes in Thermus and determine ability of Thermus species to carry out denitrification. This study addresses several of NASA's Astrobiology goals, by seeking to improve our understanding of the limits at which life can exist and the mechanisms by which microbes evolve at high temperatures. Her future aspirations include a career as an academic scientist and the improvement of STEM education and the communication of scientific research to the public.

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Carolyn Chang is a senior biology major at the University of Nevada, Las Vegas working for Dr. Brian Hedlund. Her project is to characterize novel hyperthermophilic bacteria that were isolated from hot springs in Tengchong, China.

Carolyn will be graduating in Spring 2016 and plans to teach high school biology and apply to the Peace Corps for environmental education before continuing her education and pursuit of a doctorate in a field relating to microbiology.

Ariel Friel: Currently, I am a Ph.D. student at the University of Nevada, Las Vegas in Dr. Brian Hedlund's microbial ecology lab. My research focuses on the microbial diversity and archaeal biogeography of desert springs in the southern Great Basin. I am fascinated with what limits life on Earth and I am interested in pursuing research within the field of astrobiology. Exploring the limits of life on Earth will give us a broader perspective of what it really means for an environment to be habitable. My ultimate goal is to pursue an assistant professor position so that I can begin to build my own astrobiology-focused research program.

My project for this year will focus on the archaeal biogeography objective of my proposed Ph.D. research. We have chosen to work with Archaea, rather than Bacteria, for a variety of reasons. Not only are Archaea generally less hardy than Bacteria, but previous studies have also been published demonstrating the existence of dispersal barriers and geographical partitioning within this domain. I will be generating and sequencing archaeal clone libraries for two metabolic genes, the methyl-coenzyme M reductase (mcrA) gene and the ammonia monooxygenase large subunit (amoA) gene. After DNA sequencing, I will be able to search for patterns of archaeal endemism and biogeographic range within the data. Data will be analyzed within a 3-D model framework of the tectonic (14-1 Ma) and climatic (20-0 ka) evolution of the southern Great Basin. This will allow me to explore past connections between springs and how they may influence current archaeal communities.

Armon Latifi: My name is Armon Latifi, and my arrival as an undergraduate electrical engineer at the University of Nevada, Las Vegas, is a precursor of my deliberate research in embedded systems and computer architecture. Not only do I want my career to help many lives, but I wish to make a discernable mark in the field of electrical and computer engineering in the form of a published dissertation. Earning a doctorate's degree in electrical engineering would not serve as the pinnacle of my educational pursuits, but instead as a continuation of my desire to help revolutionize computer networks and architecture to the best of my ability.

During the spring semester of 2016, I will explore the possibility of energy harvesting of solar and vibrational energy and converting this collected energy to electric power supplied to a small Unmanned Aircraft System (sUAS). Because of this, I firmly believe that I the overall flight time of the sUAS will be increased. Additionally, I will explore and implement a maximum power point tracker (MPPT) system for effective power management. Testing, monitoring, and analyzing MPPT systems will occur during various weather conditions.

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Grant Mercer is an aspiring Computer Science major at the University of Nevada, Las Vegas. He is entering his third year of attending university towards a Bachelor of Science in Computer Science, and hopes to pursue a master's degree at UNLV while considering the possibility of a doctorate. His interests lie primarily in open source projects and research; having recently worked on high performance systems with the STE| |AR group in 2014 and developing software visualization tools for NASA DEVELOP in 2015. Grant hopes to one day pursue a career in space related technology and continue working with open source projects to give back to the community he is a part of.

This fall and spring, Grant will be continuing development of the software visualization project, named visualization of CALIPSO (VOCAL), that he led while working at NASA DEVELOP. The software is designed to visualize data from the earth observations satellite CALIPSO, which collects atmospheric data scientists can use to study the effects and impact that aerosols have on human health. The primary objective of the project is to package the tool into a ready-to-use state and have an official release that scientists can begin using. Among releasing the tool to the public, there are a number of useful features that can be implemented that will help transform how users access and manipulate data. While developing VOCAL, Grant will also serve as an advisor for NASA DEVELOP and oversee any fall and spring teams that are assigned to continue development for the software.

Alex Rollings: For six years I was employed at a manufacturing plant for General Electric and worked my way up the ranks. I earned my A.S. degree while working and eventually decided to continue my education full time. I enrolled at UNR majoring in physics, and was introduced to Dr. Derevianko with whom I am conducting my current research on investigating dark matter. My project is to use software to build a model of various noisy signals for applications in searching for dark matter. This project will be the subject of my undergraduate thesis, which I will defend at the end of the 2016 Spring semester. Upon completion, I will be graduating with my bachelor's degree and plan to atten graduate school.

Sarah Thornton: My name is Sarah Thornton. I am a current Mechanical Engineering graduate student at UNLV and am taking classes towards my PhD. This semester I am taking an X-ray diffraction course, an instrumental analysis course, and structure properties relationships in materials to help further my research. I hope to eventually work on large scale renewable energy projects.

The perovskite I am researching is CsSnI3. I have developed a process and will begin depositing CsSnI3 by January. Testing of the material stability and determination of the band gap will begin by March. I will be spin coating CsSnI3 onto a glass slide before it is annealed. Using thermal anneals I will test the stability of the material. UV/VIS will be used to calculate the band gap before and after stability testing. By summer I will also be doing X-ray diffraction to determine the phase stability and grain size/grain size changes.