SPRING 2020

FELLOWSHIP & TRAINEESHIP SYMPOSIUM
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About the HSGC Fellowship & Traineeship Program

The Hawai‘i Space Grant Consortium expands educational opportunities for University of Hawai‘i System undergraduates by awarding Fellowships and Traineeships in fields that are relevant to NASA’s goals. Two levels of support, Fellowship or Traineeship, are offered depending on the skill, knowledge level, and time commitment of the student. We support the national Space Grant Agenda to help prepare the future generation of space scientists and engineers, and to increase the understanding and development of space.

More information and applications available at http://spacegrant.hawaii.edu/uri.html

*The current Fellowship & Traineeship program shall be replaced by the HSGC University Research Internships (URI) beginning for the Fall 2020 semester.

Happy 30th Anniversary, NASA Space Grant!

Established by Congress in 1988 and implemented by the National Aeronautics and Space Administration, the National Space Grant College and Fellowship Program (also known as Space Grant) contributes to the nation’s science enterprise by funding research, education, and public service projects through a national network of 52 university-based Space Grant consortia.

These consortia administer programs in all 50 states, the District of Columbia, and the Commonwealth of Puerto Rico. The consortia’s 820 affiliates include 531 academic institutions and 80 businesses. Other partners include state and local government agencies, other federal agencies, and nonprofit organizations.

Since its inception, Space Grant has awarded over 12,000 U.S. citizens with tuition assistance in science, engineering, and related fields of study.
**Jason Borgida // UH Mānoa Fellow**

Jason Borgida, a senior in Mechanical Engineering, is working with mentor Dr. Eunji Jun of the Department of Mechanical Engineering on a numerical study of chemical reactions and gas dynamics. Jason’s project, “Effects of Chemical Reactions on the Aerothermodynamic Surface Properties of Martian Atmospheric Entry Vehicles” has applications for understanding the chemical reactions inside the bow shock of spacecraft entering the atmosphere of Mars for future lander missions.

**Kayli Chun // UH Mānoa Fellow**

Kayli Chun, a senior in Mechanical Engineering, is working on the project, “Development of High-Performance Hierarchical Multifunctional Ceramic Nanocomposites Employing Carbon Nanotube Nanoforest I and Preceramic Polymers Prepregged Composites for Space Applications.” With mentor Dr. Mehrdad N. Ghasemi Nejhad of the Department of Mechanical Engineering, Kayli is researching ways to optimize strength and toughness of nanocomposite materials for improved mechanical performance, especially to avoid delamination during use in space.
**Schelin Ireland // UH Mānoa Fellow**

Schelin Ireland, a senior in Geology and Geophysics, is working with mentor Dr. Paul Lucey of the Hawai‘i Institute of Geophysics and Planetology on a project looking at craters on the Moon using orbital remote sensing data to ultimately estimate regolith thickness. Schelin is using data from the Diviner Lunar Radiometer Experiment onboard NASA’s Lunar Reconnaissance Orbiter in her project “The Thickness of the Lunar Highlands Regolith and the Implications for the Impact Flux in the Early Solar System.”

**Mikhail Polivany // UH Mānoa Fellow**

Mikhail Polivany, a sophomore in Mechanical Engineering, is working with mentor Dr. Mehrdad N. Ghasemi Nejhad of the Department of Mechanical Engineering on an ongoing nanotechnology project. Mikhail is developing and evaluating the mechanical qualities of 3-D nanocomposite materials with interlaminar conductive fillers in his project titled, “Development of High-Performance Hierarchical Multifunctional Nanocomposites employing Carbon Nanotubes Nanoforest II and Prepreg Composite for Space Applications.”
Elizabeth Swantek // UH Mānoa Fellow

Elizabeth Swantek, a sophomore in Mathematics, is working on a coordinated project with HSGC Fellow student Alan Tong to improve data analysis from drone surveys over ecologically important field sites. With mentor Dr. Monique Chyba of the Department of Mathematics, Elizabeth is working on real-time, on-board capabilities for image analysis as well as programming for visualizing remote sensing data in an immersive, virtual reality environment in her project “Augmented Autonomy for Drones.”

Eric Takahashi // UH Mānoa Fellow

Eric Takahashi, a senior in Mechanical Engineering, is working with mentor Dr. Eunji Jun of the Department of Mechanical Engineering on a numerical study of green-fuel chemistry and gas-plume dynamics for small satellites. Eric’s project, “Aerothermal Analysis of Green Propellant Flow through a Slit” supports NASA’s studies of propulsive systems for optimal performance.
Alan Tong // UH Mānoa Fellow

Alan Tong, a sophomore in Mathematics, is working on a coordinated project with HSGC Fellow student Elizabeth Swantek to improve data analysis from drone surveys over ecologically important field sites. Alan aims to apply topology (shape and structure in data) and spectral graph theory to the development of fast algorithms for mathematical clustering of remote sensing data, which can be used ultimately for automatic detection of a desired quality, such as tree health. Alan's project, with mentor Dr. Monique Chyba of the Department of Mathematics, is titled “Development of Topological Data Analysis Method for On-board UAS.”

PRESENTATION

Ahmyia Cacapit // University of Guam Fellow

Ahmyia Cacapit, a junior in Biology, is working with mentor Dr. Michael Orr of the College of Natural and Applied Sciences to study aerosol effects on the health of marine life. In her laboratory project, “Aerosol Effects on Guam's Planktonic Diatoms,” Ahmyia will study the growth rates of cultured phytoplankton exposed to aerosol particulates that she will collect from drone-heights and at sea level. This research supports ocean and tropical fisheries management as well as NASA's global studies of ocean ecosystems.

PRESENTATION
Hunter Patton // UH Mānoa Trainee

Hunter Patton, a senior in Mechanical Engineering, is working with mentor Dr. Joseph Brown of the Department of Mechanical Engineering on a laboratory project, “Actuation of the Meissner Effect in an Induced Electromagnetic Field.” Hunter is interested in experimenting with controlling the Meissner Effect while considering its possible use to activate motion of objects in space.

POSTER

Anna Gardner // Honolulu CC Trainee

Anna Gardner, a student studying Natural Science and Astronomy is working with Dr. Shidong Kan in the project “Environmental surroundings Super Massive Black Hole at the center of the Phoenix Cluster: The Fastest Growing Super Massive Black Holes.” Anna hopes to deepen her understanding of the newly found Phoenix Cluster through researching and comparing the relationship between the number and density changes of the galaxies in different shells and distance changes from the center of the Phoenix Cluster.

POSTER
Celeste Guiles // Kapi‘olani CC Trainee

Celeste Guiles, a junior in Chemistry and minoring in Physics, is working with Dr. Radovan Milincic on “Investigating the Galactic Environment around the Supermassive Black Hole Messier 87.” Celeste’s research investigates the galaxies surrounding M87, an elliptical galaxy in the southern constellation of Virgo containing an active super massive black hole at its center, and looks for any anomalies that may indicate the mechanism of its formation and evolution.

Brent Shigano // Kapi‘olani CC Trainee

Brent Shigano, a sophomore majoring in mechanical engineering, is working with Dr. Aaron Hanai of the Math & Sciences department on “Assessing the Aerodynamic Performance of Airfolis with Vortex Generator Additions.” Brent’s project utilizes a combination of 3D-modeling and computational fluid dynamics simulations to assess the aerodynamic qualities of vortex generator additions. Brent hopes to determine if these additions specifically assist in producing a greater lift to drag ratio coefficient to possibly reduce fuel utilized by the aircraft over the time it’s used.
Katlynn Vicuna // Kapiʻolani CC Trainee

Katlynn Vicuna, a freshman in Engineering, is working with Dr. Aaron Hanai on an astronaut-health-related project, “Bones, Organs, Muscles, and Even Bugs (B.O.M.B).” In this project, Katlynn’s overall goal is to see how adequately the human body can adapt in any given scenario for optimal nutrition while maintaining the majority of muscle mass and bone density. This will be done in two phases. The first phase focuses on optimizing maximum muscle regeneration with minimal effort and equipment while the second phase monitors body inputs and variables after consuming beef vs. consuming insects.

Kody Cosco // Kapiʻolani CC Trainee

Kody Cosco, a junior in mechanical engineering, is working with Alden Andrei Fernandez and Jatin Pandya on a project focused on developing a drone that can be used for geo-mapping and exploring Saturn's Moon Titan. The overall goal of the project is to observe the effects of different atmospheres and environments on a drone which will help further develop how drones are designed and built for the future. Kody’s goals include design and fabrication of the rotorcraft to be utilized for exploration of Titan on “Mechanical & Structural Design of a Deployable Drone.”
Alden Andrei Fernandez // Kapiʻolani CC Trainee

Alden Andrei Fernandez, a junior in engineering, is working with Alden Andrei Fernandez and Jatin Pandya on a project focused on developing a drone that can be used for geo-mapping and exploring Saturn's Moon Titan. The overall goal of the project is to observe the effects of different atmospheres and environments on a drone which will help further develop how drones are designed and built for the future. Alden's goals include designing and creating the circuit layout for the drone on “Circuits and Systems Development of a Drone Intended for Exploring Saturn’s Moon Titan.”

Jatin Pandya // Kapiʻolani CC Trainee

Jatin Pandya, a junior in ASNS ICT, is working with Kody Cosco and Alden Andrei Fernandez on a project focused on developing a drone that can be used for geo-mapping and exploring Saturn's Moon Titan. The overall goal of the project is to observe the effects of different atmospheres and environments on a drone which will help further develop how drones are designed and built for the future. Jatin's goals include programming sensors such as cameras, GPS, and accelerometers for the drone on “Geomapping of a Surface Using a Drone.”
Noah Franco // UH Maui Trainee

Noah Franco, a junior in Engineering Technology, is working with Dr. Jung Park on the project “Electromagnetic Switch-Release System Design.” Noah’s goal is to design, build and test an electromagnetic system that can be remotely operated. By creating an electromagnetic system that has a powerful magnetic force, Noah hopes to potentially see this as a replacement for many common coupling systems.

Jedediah Kobobel // UH Maui Trainee

Jedediah Kobobel, a freshman in Electronic & Computer Engineering Technology, is working with Dr. Chad Junkermeier of the STEM department on “Using Carbophenes as Molecular Filters.” Jedediah’s project evaluated the use of these carbon crystals as a filter for CO₂. Jedediah’s work consisted of using previous theoretical work, 3D modeling software, Density Functional Theory, and molecular bonds testing.
Project IMUA: Spaceport America Cup // Honolulu CC Trainees

The Honolulu Community College Team.
From left to right: Craig Opie, Katherine Bronston, Leo Tanaka, Anna Gardner, Dr. Kerry Tanimoto, Danthone Buyacao, Dr. Shidong Kan, Mia Fong, Lindsey Agustin, Anthony Lopez, and Dr. Mevan Ranasinghe.

Spaceport America Cup 2020: 1U CubeSat

Presenters: Lindsey Agustin, Danthone Buyacao, and Anthony Lopez
For Project Imua Mission 8, the University of Hawaii Community Colleges Payload Team will be building a payload that consists of a two-CubeSat-small-swarm consisting of a 1U CubeSat and a 2U CubeSat. The payload units will descend using separate parachutes while collecting, storing, and transmitting sensory data. The child CubeSat will feature a GPS, dust sensor, barometer, inertial measurement unit (IMU), power supply, data storage, and two XBee radios to communicate with the main CubeSat and ground station respectively. The 1U CubeSat will be tethered to the nose cone of the rocket built by Windward Community College (vehicle team).

Spaceport America Cup 2020: 2U CubeSat

Presenters: Mia Fong, Craig Opie, and Leo Tanaka
The 2U CubeSat will feature a GPS, IMU, dust sensor, barometer, infrared (IR) video camera, power supply, data storage, two XBee radios, and wifi transmission for the live video feed. The main CubeSat will feature an IR video feed that will be transmitted in near real-time to the ground station for viewing. After the parent CubeSat lands, the video feed will terminate. During this time, GPS coordinates of both units will continue to be transmitted to the ground station for recovery. The new GPS coordinates of the CubeSats will be transmitted to the ground station every minute or if either CubeSat is relocated greater than a hundred feet prior to recovery.
Project IMUA: ESRA/IREC Spacecup // Windward CC Trainees

The Windward Community College Team.
From left to right: Connor Wilson, Jared Estrada, and Connor Smith.

Spaceport America Cup 2020: Rocket Structure

Spaceport America Cup is the world’s largest intercollegiate rocketry conference and competition. Organized by the Experimental Sounding Rocket Association, the event promotes teamwork, encourages students to pursue research in a space science field and thus gives them the opportunity to test their skills and abilities in developing a functional rocket that can transport a payload of a given weight. The team is comprised of both HCC students that will focus on the payload challenge and WCC students that are tasked with working on the structural components of the rocket.

The Windward Community College Team with the rocket, Apophis.
From left to right: Jessica Jacobs, Patrick Ng, Jared Estrada, and Dr. Jacob Hudson.
HSGC Fellowship & Traineeship Symposium Spring 2020

POWERPOINT PRESENTATIONS

UH MĀNOA FELLOWS
• Jason Borgida
• Kayli Chun
• Schelin Ireland
• Mikhail Polivany
• Elizabeth Swantek
• Eric Takahashi
• Alan Tong

UNIVERISTY OF GUAM FELLOW
• Ahmyia Cacapit

HONOLULU CC PROJECT IMUA TRAINEES
• Lindsey Agustin, Danthone Buyacao, and Anthony Lopez
• Mia Fong, Craig Opie, and Leo Tanaka

WINDWARD CC PROJECT IMUA TRAINEES
• Jared Estrada, Connor Smith, and Connor Wilson

POSTER PRESENTATIONS

UH MĀNOA TRAINEE
• Hunter Patton

UH MAUI COLLEGE TRAINEES
• Noah Franco
• Jedeiah Kobobel

HONOLULU CC TRAINEE
• Anna Gardner

KAPIʻOLANI CC TRAINEES
• Kody Cosco, Alden Andrei Fernandez, and Jatin Pandya
• Celeste Guiles
• Brent Shigano
• Katlynn Vicuna

MAHALO FOR YOUR PARTICIPATION IN THE FELLOWSHIP & TRAINEESHIP SYMPOSIUM!
MAHALO FOR YOUR SUPPORT!