

Hawaii Space Grant Consortium
University of Hawaii at Manoa
Dr. Luke Flynn
808-956-3138
<http://www.spacegrant.hawaii.edu>

PROGRAM DESCRIPTION

The National Space Grant College and Fellowship Program consists of 52 state-based, university-led Space Grant Consortia in each of the 50 states plus the District of Columbia and the Commonwealth of Puerto Rico. Annually, each consortium receives funds to develop and implement student fellowships and scholarships programs; interdisciplinary space-related research infrastructure, education, and public service programs; and cooperative initiatives with industry, research laboratories, and state, local, and other governments. Space Grant operates at the intersection of NASA's interest as implemented by alignment with the Mission Directorates and the state's interests. Although it is primarily a higher education program, Space Grant programs encompass the entire length of the education pipeline, including elementary/secondary and informal education. The Hawaii Space Grant Consortium is a Designated Consortium funded at a level of \$785,000 for fiscal year 2009.

PROGRAM GOALS

The Hawaii Space Grant Consortium (HSGC) inspires, nurtures, and trains the space scientists, space settlers, and aerospace engineers of the future. HSGC strategy and programs are dynamic and reviewed annually to reflect State as well as NASA program needs and include development and maintenance of the HiSTEM Pipelines of activities (undergraduate/graduate opportunities supported by pre-college activities in the areas of space science, engineering, and remote sensing), enhancing undergraduate education through research (fellowships, traineeships, and internships that **must** have a NASA focus) and course curricula, improving research infrastructure (Hawaii Space Flight Laboratory (HSFL) and NASA Lunar Science Institute), training pre-service and in-service teachers (Future Flight Hawaii Programs), and educating the public about new NASA discoveries (Windward Community College Aerospace Lab, Planetary Science Research Discoveries), helping to strengthen the State economy (HSFL, supporting the Hawaii Governor's Innovation Initiative in robotics).

PROGRAM/PROJECT BENEFIT TO OUTCOME (1,2, OR 3)

Mr. Jeremy Chan – Outcome 1 – Jeremy Chan is an HSGC post-graduate fellow and Systems Engineer for the HawaiiSat-1 small satellite project. Jeremy started at Kapiolani Community College and helped establish the KCC CanSat group. He was the systems engineer and later project manager for the Kumu A'o CubeSat development. After completing his Master's, Jeremy would like to start a satellite business in Hawaii.

Mr. Chester Lim – Outcome 1 – Chester Lim is a PhD student and an HSGC fellow who has spent 3 summers at JPL working on research projects. Chester has received an offer to work at JPL and will become a NASA researcher upon graduation.

Community College USLI – Outcome 1 – Windward Community College participated in the University Student Launch Initiative for the first time. Three of the WCC rocketry team now have Class 2 rocketry licenses.

Astronaut Ellison Onizuka Day of Discovery – Outcome 2 & 3 – HSGC has partnered with American Savings Bank to annually sponsor Ellison Onizuka Day, a series of hands-on workshops and presentations that focus on STEM and NASA science. Spaces for 650 student-parent pairs are fully reserved within days of online access to registration.

PROGRAM ACCOMPLISHMENTS

Outcome 1: Hawaii Space Flight Lab (HSFL) – The HSFL is an HSGC Research Infrastructure program that is leveraging State, Federal (including NASA), and corporate partners to provide student and workforce training opportunities to design, build, launch, and operate small spacecraft. The State of Hawaii signed an agreement with NASA Ames to help with HawaiiSat-1. LEONDAS is HSFL's two-launch demonstration project. HawaiiSat-1 will fly on the second HSFL mission. *Kauai Community College Interns* – Kauai CC has continued to expand its internship program with some interns working at the Pacific Missile Range Facility, others helping to establish a Kauai CC rocketry program, and still others involved in the design and construction of the Kauai CC UHF/VHF Ground Station that will be used by HSFL to communicate with satellites.

Outcome 2: HI-STEM – HSGC maintains pipelines of activities from K-12 through graduate school that are collectively called Hawaii Science Technology Engineering and Math or HI-STEM. HI-STEM allows HSGC to channel students, especially underrepresented students, towards NASA and STEM careers. HI-STEM has three primary pathways (space science, engineering, and remote sensing) with evolving subject matter and activities that allow HSGC to adjust to NASA priorities and discoveries.

Outcome 3: Windward Aerospace Lab – Windward CC is constantly expanding the offerings of its Aerospace Lab that includes flight simulators, a planetarium, radio telescopes, and soon, the HSFL education and public outreach center to track HSFL missions. Windward CC's Dr. Jake Hudson is also helping with the Kauai CC rocketry program. *HSGC Assistance to the Imiloa Center* – HSGC is assisting the Imiloa Center to become part of the New York Space Grant solar system exhibit. The Imiloa Center represents the closest star at the scale of the solar system contained in downtown Ithaca. *Astronaut Days of Discovery* – These days celebrate Hawaii's astronauts and remain overwhelmingly popular. They showcase NASA and STEM presentations and hands-on activities. HSGC coordinates the events but Hawaiian Electric Company and American Savings Bank donate funds and volunteers to make the events successful.

PROGRAM CONTRIBUTIONS TO PART MEASURES

- Longitudinal Tracking: Total Fellowship/Scholarship awards in 2009 = 80; 36 of the total awards represents underrepresented minority F/S funding including 19 awards to women. 45 students are pursuing advanced STEM degrees, 21 of which are

underrepresented, while 6 students (3 underrepresented) have accepted STEM positions in the aerospace industry.

- Course Development: HSGC has developed 12 courses in Geology (305: Geological Field Methods, 460: Remote Sensing, 466: Planetary Geology, 593: Mission to the Red Planet, 611: Accelerated Intro to Geology, 673C: Petrologic Evolution of the Moon and Mars, 711(Seminar): Terrestrial and Space Energy Resources, 711(Seminar): Applied Field Methods Merging GPS and GIS Techniques), Geographic Information Systems (WCC 150: Intro to GIS), Electrical Engineering (199: Design Project, 496: Senior Capstone Project, 499: Senior Design Project), Mechanical Engineering (419: Astronautics).
- Matching Funds: HSGC maintains a 1 to 1 match of non-Federal support for the HSGC to non-Fellowship NASA Space Grant support; however, counting Federal support through other grants and contracts the ratio is approximately 8 to 1.
- Minority-Serving Institutions: UH-Hilo as well as all of the UH System Community Colleges are minority serving institutions. The HSGC maintains strong ties with its affiliates through dedicated associate directors. Windward, Honolulu, Kapiolani, Kauai, and Maui CC receive HSGC support for CanSat programs. Windward CC is also supported for the Aerospace Lab and for providing education and outreach for HSFL. Kauai CC has installed a UHF/VHF ground station for the HSFL and new research experiments.

IMPROVEMENTS MADE IN THE PAST YEAR

- HSGC continues to develop programs on Kauai. HSGC has sponsored interns at PMRF and other local industries, summer trainees at the Kauai CC Optics Lab, a rocketry team at Kauai CC that has launched and recovered their own CanSat at PMRF, and a UHF/VHF Ground Station that will be used for HSFL satellite communication as well as Kauai CC student research projects.
- HSFL development (Research Infrastructure, Higher Education). The HSFL is a truly cooperative, multidisciplinary program that includes Federal (PMRF, Navy launch range; NASA Ames Research Center), State (Hawaii government – support for HSFL faculty positions; UH – support for infrastructure development; UH campuses – support for HSFL activities) and private (Aerojet, Inc., a GenCorp Company – Cooperative agreement to develop 3 rocket motor stages; NovaSol – support for instrumentation on second mission; NorthStar Communications - environmental testing support) organizations.
- Governor’s Initiative on Robotics – Governor Lingle has chosen HSGC-supported robotics activities (FIRST Robotics, Botball, VEX, and HURC [Hawaii Underwater Research Challenge]) as models for a State-wide program to increase STEM education. HSGC Future Flight Hawaii Director Art Kimura heads this program which has received over \$1 million in Federal and State support for after school robotics programs. Hawaii has again held a FIRST regional competition in which 45 Hawaii teams participated thanks to support from the Governor.

PROGRAM PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

UNIVERSITY OF HAWAII AT MANOA – 4-year university with graduate programs – Director Luke Flynn; Program Coordinator Marcia Rei Sistroso; Headquarters of HSGC and HSFL; majority of graduate and undergraduate fellows, interns, and trainees perform research in CubeSat and small satellite design, astronomy, planetary science, geology, engineering, marine science, remote sensing, and computer science.

UNIVERSITY OF HAWAII AT HILO – 4-year university with graduate programs – Associate Director Ken Hon; undergraduate fellows and trainees have focused research on the strong astronomy, geology, and remote sensing programs. UH-Hilo along with American Savings Bank hosts the Astronaut Ellison Onizuka Day public science program annually in January.

UNIVERSITY OF MAUI COLLEGE – 4-year university with graduate programs – Associate Director John Pye; undergraduate fellows and trainees have focused research in astronomy, optics, and STEM. The Akamai Internship Program gives students opportunities for internships through the Center for Adaptive Optics.

HAWAII COMMUNITY COLLEGE – Associate degree granting community college – Associate Director Bernhard Laurich; undergraduate focus on STEM and astronomy.

HONOLULU COMMUNITY COLLEGE – Associate degree granting community college – Associate Director Gregory Witteman; undergraduate fellows and trainees have focused research on CanSat design. HCC assists with Astronaut Lacy Veach Day which is a festival of science activities held on Oahu in October.

KAPIOLANI COMMUNITY COLLEGE – Associate degree granting community college – Associate Director John Rand; undergraduate fellows and trainees have focused research on CanSat design and competitions, and engineering. KCC receives Federal funding to attract underrepresented students to STEM careers and HSGC programs.

KAUAI COMMUNITY COLLEGE – Associate degree granting community college – Associate Director Stewart Burley (Strategic Theories Unlimited, Inc.); undergraduate fellows, interns, and trainees have focused research on STEM including satellite telemetry with a new ground station, rocketry, CanSat, meteorology, and optics.

LEEWARD COMMUNITY COLLEGE – Associate degree granting community college – Associate Director Roger Kwok; undergraduate fellows and trainees have focused research on astronomy. LCC assists with Astronaut Lacy Veach Day which is a festival of science activities held on Oahu in October.

WINDWARD COMMUNITY COLLEGE – Associate degree granting community college – Associate Director Joseph Ciotti; undergraduate fellows and trainees have focused research in astronomy, CanSat design and competition, and rocketry. WCC hosts the Aerospace Lab, serves as outreach for HSFL, and offers an aerospace certificate.

UNIVERSITY OF GUAM – 4-year university with graduate programs – Associate Director Mark Lander, undergraduate focus on STEM.

HAWAIIAN ELECTRIC COMPANY – industrial affiliate – Associate Director Paul Fetherland; HECO supports Astronaut Lacy Veach Day and other HSGC programs both with funding and volunteers.