PISCES NEWSLETTER

PACIFIC INTERNATIONAL SPACE CENTER FOR EXPLORATION SYSTEMS * HILO, HAWAII

JUNE, 2015 VOL #3 ISSUE #6

Former PISCES Intern Lands NASA Internship

Former PISCES intern Christina Cauley has landed an exciting NASA summer internship at Marshall Space Flight Center. The University of Hawai‘i at Hilo graduate will be working on Project Good Earth, an OSSI NASA initiative that will compile and enable access to data from a new remote sensory instrument aboard the International Space Station. The data will be used toward humanitarian and commercial applications worldwide.

Project Good Earth parallels another NASA initiative, project SPoRT (Short-term Prediction Research and Transition center), which utilizes satellite data to improve regional weather forecasts, conduct climate studies, improve disaster responses, and more. Dr. Gary Jedlovec, who has headed project SPoRT for the last 12 years, will be mentoring Cauley in her work.

Her 10-week internship begins June 1 and runs through Aug. 7 at Marshall Space Flight Center in Huntsville, Alabama.

Cauley, who majored in Geology and Anthropology, and minored in Biology, said she could not pass up the opportunity when she learned about it.

“The project seems like it is the perfect conjoining of anthropology, geology, and remote sensing,” she observed.

Cauley says she looks forward to working on the international project that “brings together science and society.” She credits her summer internship experience at PISCES for building her confidence and exposing her to space research.

“I'm confident that having PISCES and my space grant fellowship on my resume made me a much stronger candidate when being considered for this summer's opportunity,” she explained.

MESSAGE FROM THE EXECUTIVE DIRECTOR

Celebrating the 50th Anniversary of America’s first Spacewalk and the advent of Mission Control-Houston

Dear PISCES Friends and Family,

June 3rd represents a historic 50th anniversary for manned-spaceflight: the June 3rd, 1965 launch of Gemini IV, America’s first space walk in space (extravehicular activity, a.k.a. EVA), and the first Gemini mission to be controlled by the new Mission Control Center in Houston Texas.

Astronauts James McDivitt and Edward H. White, II circled the Earth 66 times in four days. The highlight of the mission was a 20-minute tethered spacewalk by Ed White. White was given a “Go for EVA” over the Hawaii tracking station on the 3rd orbit. He successfully “walked” through space across the United States until he re-entered the spacecraft over the Bermuda tracking station.

The other significant milestone of Gemini IV was that it represented the first manned spaceflight to be controlled from the Mission Operation Control Room (MOCR) in Houston. All the previous NASA missions for Mercury and the earlier Gemini missions had been controlled from by the Mission Control Center located at Cape Canaveral in Florida. There were two MOCRs that supported the space flight missions. MOCR 2 was used for all other Gemini and Apollo flights (except Gemini 3) and was located on the third floor of the famed Building 30 Mission Control Center. As the flight control room for Apollo 11, the first manned moon landing, MOCR 2 was designated a National Historic Landmark in 1985. It was last used in 1992 as the flight control room for STS-53 (….controlled by Lead Flight Director Rob Kelso) on the last of the secret NASA-DoD missions to fly on the Space Shuttle. The Houston Mission Control Center continues to direct the International Space Station (ISS) to this day.

PISCES honors and recognizes the significant achievement of Gemini IV occurring 50 years ago this month.

Until next time,
Res Gesta Per Excellentiam
(Achievement Through Excellence)
-Rob Kelso, PISCES Executive Director

Rob Kelso, PISCES Executive Director

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PISCES WELCOMES 2015 SUMMER INTERNS

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PISCES Seeks Budget Solutions

PISCES is facing an awkward financial position after lawmakers approved the purchase of an $8.5 million state-of-the-art headquarters and test facility for the Center, but declined to add $1.4 million in general funds needed to cover personnel, administrative and operations costs for the upcoming fiscal year (July 1, 2015 – June 30, 2016).

The state-funded aerospace agency is excited and thankful for the legislative backing of a world-class, multi-purpose processing facility that can support the High Tech Development Corporation's incentive to create 80,000 new technology jobs with salaries of $80,000 by 2030.

However, additional funding needed to keep the current level of operations was not appropriated, and PISCES is now working to streamline and prioritize activities. The Center will operate normally through the end of 2015, and scale back activities in 2016 through the end of the fiscal year. In the meantime, PISCES is actively seeking additional funding sources to cover the gap in available funds between FY16 and FY17.

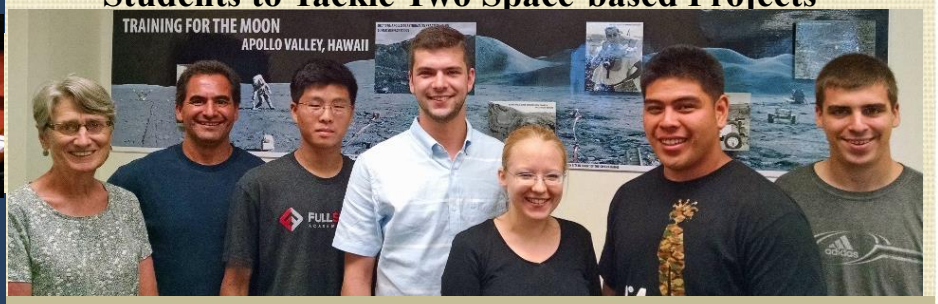
PISCES is actively involved in several high-profile projects, including Moon RIDERS (Research Investigating Dust Expulsion Removal Systems), a program in partnership with NASA that has given Kealakehe High and `Iolani School students the opportunity to develop a historic experiment on the surface of the moon – a feat that, to the Center's knowledge, has never been done before.

Another project at work is the "lunar sidewalk" that PISCES recently installed in Hilo, in partnership with the Hawaii County Department of Research and Development, NASA, University of Hawaii at Manoa, and Kodiak FRP Rebar. The project could pave the way for cost-saving, green alternatives for Hawaii construction, but also for the moon and Mars.

Over the last two years, PISCES has gained interest from NASA as well as international space agencies in Japan, Canada, Europe, and the private sector.

PISCES looks forward to continuing partnerships domestically and abroad to continue developing high-technology workforce and economy throughout the state of Hawaii.

Students to Tackle Two Space-based Projects



(L-R) PISCES Admin. Polly Roth, Proj. Mgr. Rodrigo Romo; Interns Karlin Yeh, Eric Boucher, Valerie Wasser, Ernesto Esparzo, and Colin Milovsoroff.

PISCES is pleased to welcome its 2015 Summer interns and volunteers to the Center 'ohana. This year, six bright college students have joined the ranks. The new recruits will be working on some exciting space projects that will give them hands-on experience to develop and apply their working knowledge of their respective college studies.

Under the direction of PISCES Project Manager Rodrigo Romo, interns Ernesto Esparza and Karlin Yeh will be outfitting the Helelani planetary rover with three integrated mechanical systems that will enable the rover to robotically execute the basalt landing pad construction project (ACME). The systems involve a leveling blade, polymer spray system, Paver Deployment Mechanism (PDM) and sintering technology.

Ernesto is a hands-on, problem solving kind of guy and is pursuing a career in Mechanical Engineering. He is currently in his fourth year at the University of Hawaii at Manoa's Mechanical Engineering program. Ernesto says he grew up farming in Pahoa on Hawaii Island which gave him character and pushed him to work hard.

Karlin comes to PISCES from Cooper Union in New York City. The New Jersey freshman is also studying Mechanical Engineering, and has a strong interest in robotics. He wants to make a beneficial impact on society through his work, and has eight years of international robotics competitions under his belt.

PISCES Test Logistics/EPO Manager John Hamilton is leading another team to survey planetary analogue test sites on Hawaii Island. Returning PISCES intern Colin Milovsoroff will lead his fellow student interns, Valerie Wasser and Eric Boucher, in the effort to identify new skylights, lava tubes, and other sites that would serve as useful planetary analogues for pre-spaceflight testing.

Colin, who interned with PISCES last summer, is now a junior Geology major at University of Hawaii at Hilo. He says he finds working with PISCES "interesting and fun," and is most excited about getting out into the field. The Seattle native is known for his avid love of coffee, often seen around PISCES headquarters with a mug-in-hand.

Valerie is also a UH Hilo student studying Geology, and hails from Switzerland. She is interested in learning more about Hawaii Island's geology, and getting experience with others in her field. She plans to get a Master's degree following her undergraduate studies.

Eric comes to PISCES from Ontario Canada, and studies Physics and Political Science at the University of Guelph. In addition to working with the PISCES planetary analogue site survey team, Eric will also be assisting with public outreach during the STARS workshop and PRISM competition over the summer. In his free time, Eric enjoys volleyball and dance, and volunteering to help others.

Welcome to the team everyone!

PISCES LAUNCHES ROBOTIC SPACE CONSTRUCTION PROJECT

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PISCES Recognizes Second-grader for Naming Center's Rover

PISCES Staff recognized Mahealani Lee (standing on rover) with a certificate of award for her winning name entry in the rover naming contest held last Fall.

PISCES' planetary rover paid an unexpected visit to Ka `Umeke Ka`eo public charter school in Hilo May 22 to recognize a student who coined the spacecraft's new name.

Second-grader Mahealani Lee entered the name "Helelani" (which translates to "heavenly travels") last Fall during the PISCES' rover naming contest held at four local elementary schools. Her entry was selected out of 174 imaginative submissions.

PISCES staff navigated the rover over campus grounds after morning assembly to conduct an official naming ceremony with Mahealani and her classmates. She was accompanied by roughly 100 fellow students, her mother, and school faculty.

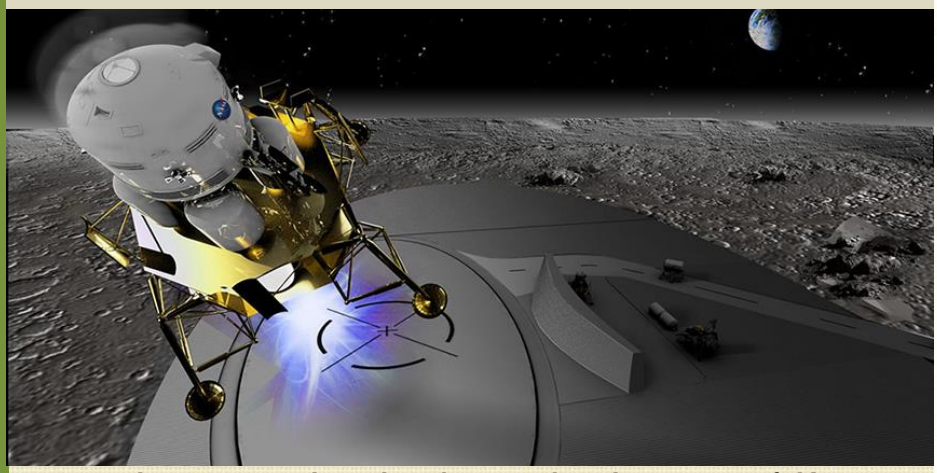
Mahealani was presented with a certificate of award for her stellar idea, as well as a Helelani sticker to place on the rover's frame. She sealed the deal by taking the rugged spacecraft for a brief test drive.

"Do you have your driver's license?" asked PISCES Project Manager Rodrigo Romo before showing her the controls. "Don't worry, you don't need one on Mars."

Students also got a close-up Q&A session on the rover with Romo, who manages the rover's development and operation with a group of technicians and interns. Romo explained the purpose of the spacecraft's many gadgets, and how PISCES uses them to conduct simulated extraterrestrial experiments on Hawai'i Island.

PISCES conducted the rover naming contest in a continuing effort to inspire youth in STEM (science, technology, engineering, and math) related fields by showing them how applied science can be fun and engaging.

Lunar Landing Pad to Be Built Using ISRU



Above: Artist rendering by Behnaz Farahi and Connor Wingfield.

PISCES is launching a new space construction project that could bring the dream of space settlement a step closer to reality.

The project, called ACME (Additive Construction for Mobile Emplacement), is a joint initiative with NASA Kennedy Space Center's Swampworks, and aims to robotically build a lunar landing pad using volcanic basalt on Hawaii Island. The goal is to successfully build a landing pad on Earth using local materials, so that it can be done in space.

To construct the pad, PISCES and SwampWorks will be utilizing ISRU, or in-situ resource utilization, sourcing volcanic basalt as a building material. Basalt is nearly identical to the regolith (dirt) found on the Moon and Mars, and developing a method to use it effectively for construction on Earth could be applied in space.

PISCES and SwampWorks are now in the process of designing and manufacturing pavers made of volcanic basalt to form the 9-square meter landing pad. Surrounding the pad will be a 225-square meter perimeter of stabilized basalt to provide additional dust mitigation.

Landing pads will be a crucial component in future space colonies. Spacecrafts can cause high velocity dust storms during take-off and landing, blasting planetary dust in all directions. These jet-propelled sandblasts could cause significant damage to neighboring structures and space equipment. To mitigate this problem, landing pads offer a flat, stable surface to prevent such damages.

The ACME project employs several of PISCES' core objectives, including the Helelani planetary rover, advanced manufacturing, and a planetary analog testing site. The Helelani rover will robotically prepare and perform the construction, and is currently being outfitted with tools and programming that will allow it to grade, level, and compact the landing pad site. In addition, ACME will employ basalt sintering technology to grout the basalt pavers and stabilize the peripheral area.

Initial testing for the project is scheduled to begin this summer, with construction slated for the fall.

The basalt-based landing pad will be built in the Puna area of Hawaii Island, and be the first of its kind in the state.

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- @PISCES_Hawaii

JUNE, 2015

PISCES Welcomes New Robotics Tech

PISCES is pleased to welcome its latest addition to the team, Teddy DeRego. Teddy has been hired on as a robotics tech working alongside his friend and colleague, Casey Pearring, under the direction of PISCES Project Manager Rodrigo Romo.

The Kamehameha School graduate is tasked with building a program that will allow users from anywhere in the world to operate the Helelani planetary rover. He will also be integrating a time-delay emulator, which simulates the signal delay between planets when operating robotics remotely. There are also plans to set up a "mission control center" at PISCES headquarters.

Teddy is currently a senior at the University of Hawai'i at Hilo studying Computer Science. The Hawai'i native said his work with PISCES gives him a chance to write software that works with a hardware system - something he's always wanted to do.

"Also, it's hard to pass up the opportunity to work on a big, cool-looking rover," he added.

For the future, Teddy has his sights set on becoming a software engineer for large, networked, real-time systems. He also takes interest in artificial intelligence, and finds Elon Musk, CEO of Tesla Motors and SpaceX, to be a "pretty inspiring dude."

Welcome to the team Teddy!

WE ARE LIVE!!!

Check Out PISCES on the Web!

PISCES.HAWAII.GOV

Helelani Rover

ABOUT US

PISCES is a Hawaii State Government Aerospace Agency located in beautiful Hilo, Hawaii. The research and education/training center is part of the State Department of Business, Economic Development, and Tourism (DBEDT), and conducts environmentally safe field demonstrations to test and validate innovative space technologies on Hawaii's volcanic terrain under the jurisdiction of the Hawaii State Department of Land and Natural Resources (DLNR).

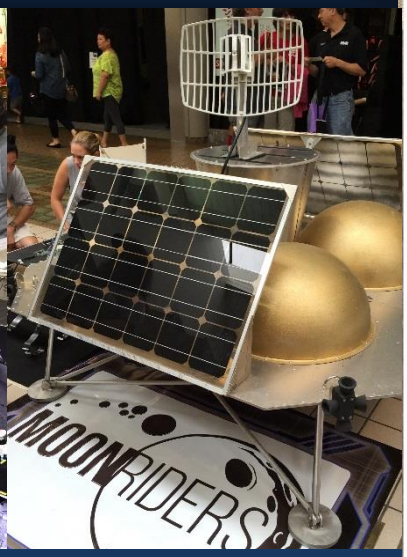
PISCES Brings Space to Earth for AstroDay

PISCES brought the wonders of space exploration down to Earth during an annual astronomy outreach event on May 2. AstroDay, held at Hawaii Island's Prince Kuhio Plaza in Hilo, drew crowds of curious visitors, young and old, to share in the fascination of astronomy and space-related sciences.

PISCES engaged visitors with a GLXP MoonBots demonstration – which simulates a space mining exercise - and a mock-up lunar lander built by `Iolani School students for the Moon RIDERS student lunar flight experiment. The University of Hawaii at Hilo's Robotics Team also joined the PISCES crew with their innovative space robot to share with the public.

The event featured over forty exhibits with demonstrations, activities and music. Presenters included PISCES, the major observatories on Mauna Kea, educators, students, Hawaiian cultural groups, and vendors.

AstroDay coincides with International Astronomy Day, which aims to inspire the general public with the wonders of astronomy.



Left: Visitors engage in PISCES' GLXP MOONBOTS demonstration during Astroday; Right: 'Iolani School's mock-up lunar lander modeled after the Astrobotic "Griffin" lander.