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Top Results for Biotechnology, Health and Education Announced


June 20, 2014 (<https://sallyridescience.ucsd.edu/top-results-for-biotechnology-health-and-education-announced/>)
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From creating better vaccines, to helping the elderly, to inspiring students, the International Space Station creates a versatile research environment to study science, education and health — and to learn from them in ways that lead to life-changing results.

At the third annual ISS Research and Development conference June 17, four individuals and their teams received awards for their work in Biotechnology, Health and Education.

In addition to receiving awards in their areas of focus, the following honorees discussed their research with conference attendees at the second plenary panel:

* Timothy Hammond, M.B., B.S., U.S. Department of Veterans Affairs and Duke University School of Medicine, Durham, North Carolina, in recognition of top results for Microbes, Microgravity and Microvirulence with the National Laboratory Pathfinder-Vaccine-Methicillin-resistant Staphylococcus aureus (NLP-Vaccine-MRSA), NLP-Vaccine-Salmonella and NLP-Vaccine-Survey.

* Jacob Bloomberg, Ph.D., %image_alt%
NASA's Johnson Space Center in Houston, in recognition of top results for the Functional Task Test and understanding the effects of long-duration space flight on astronaut functional task performance.

* Alvar Saenz-Otero, Ph.D.,
Massachusetts Institute of Technology in Cambridge, in recognition for top results for the Zero Robotics: ISS Programming Challenge.

* Karen Flammer, Ph.D., Sally Ride Science and University of California, San Diego (UCSD), in recognition for top results for Sally Ride EarthKAM (Earth Knowledge Acquired by Middle School Students).

"These selected teams have one goal in mind: to better our lives here on Earth," said Allyson Thorn, NASA ISS Research Integration Office, who was part of the award selection committee. "Through their research, we are on the path to gain a deeper understanding of the planet we live on, and to connect the younger generation with a lab that they can't find in their schools. A lab that will give them the opportunity to put their own scientific theories to the test that will hopefully improve the world, sparking excitement and enthusiasm to continue with these studies."

This year's conference theme is discoveries, applications and opportunities. To be more specific: discoveries in microgravity, space and Earth science, as well as engineering and education; applications benefitting Earth, enabling technology and forwarding exploration; as well as opportunities for use of this innovative laboratory. The conference takes place from June 17 to 19 in Chicago and is the only annual U.S. conference to detail the scope of research and technology development on the space station.

Researchers working with Hammond on the vaccine investigations used space to examine several disease-causing microorganisms with a goal of assisting in the development of potential vaccines for the prevention of infections on Earth and in microgravity. Results from these experiments may help scientists clearly understand measures that should be taken to reduce the risk of infection and contraction of disease while in space. This study may help develop vaccines against these life-threatening organisms.

“Our research provides some unique insights into control of bacterial virulence,” said Hammond. “Bacteria are increasingly resistant to antibiotics, and new approaches to treating bacterial infections are critically needed clinically. We found a variety of bacteria are less virulent in space, and have some clues as to the mechanism. The space station is a unique platform to bring clinically relevant knowledge back to Earth, so we are extremely happy and thrilled to receive this award.”

The contributions of Bloomberg and his team can help elderly and clinical populations whose activities of daily living are often impaired by multiple physiological causes. The information obtained from the Functional Task Test will help in the design of clinical interventions and rehabilitation programs that can target specific systems responsible for decline in functional performance.

The team is developing training countermeasures designed to enhance the ability of astronauts to adapt to new gravitational environments. They have shown that these training programs can also be used to improve balance and gait performance in elder subjects, and points to the general applicability of this type of training in different clinical populations.

“I am honored to accept this award on behalf of our entire interdisciplinary team here at Johnson [Space Center],” said Bloomberg. “It represents the culmination of several years of work obtaining data from both spaceflight and bed rest to aid in our understanding of how spaceflight impacts performance of astronauts.

Zero Robotics is familiar to many students across the world. The program results in more middle- and high-school students remaining interested in science, technology, engineering and mathematics (STEM) careers by engaging them in the space program. The ISS Programming Challenge was created to help advance humanity both in space and at home.

“The award was an unexpected honor for the Zero Robotics team,” said Saenz-Otero. “While we have been increasing outreach ourselves, this award means further recognition — a chance to be known by more people — so that we can multiply the number of students reached by this program. Students should see competitions like this as important and valuable as any sports competition.”

According to Saenz-Otero, during four years of U.S. competitions, Zero Robotics has reached more than 5,000 students who have programmed advanced algorithms code to control the Synchronized Position Hold, Engage, Reorient, Experimental Satellites (SPHERES) in simulation. SPHERES are bowling-ball-sized spherical satellites used aboard the space station to test autonomous rendezvous and docking maneuvers for spacecraft.

Continuing with the education theme, Sally Ride EarthKAM allows middle school students all over the world to take their own pictures of Earth from space. It also engages undergraduate students at UCSD, who support the EarthKAM mission operations center located at the university. EarthKAM is a unique, hands-on project that provides experience in operating an instrument on the station, enabling students and teachers to learn about Earth from that unique orbital perspective. The entire collection of EarthKAM images, and accompanying learning guides and activities, are resources to engage students in Earth and space science, geography, climate change, social studies, mathematics, communications and art.

“It is a great honor to receive this award on behalf of the team, but most importantly to me, this award honors the legacy of NASA astronaut Sally Ride, the first American woman in space,” said Flammer. “The late Dr. Ride initiated EarthKAM in 1994, and I was fortunate to work with her on this program since its inception. Dr. Ride was an advocate for improved science education. She realized that space exploration was a perfect way to inspire students to pursue science and engineering. EarthKAM is an extremely successful education program that effectively stimulates student interest in STEM by allowing them to use the EarthKAM camera on the station to learn more about Earth’s topography, its landforms and geologic processes.”

Approximately 500,000 middle school students, representing thousands of schools in 78 countries, have participated in EarthKAM since the program began, and 500 undergraduate students at the USCD have received scholarships or academic credit to work on the program. They have taken more than 75,000 images of Earth.

Additional award categories for the conference include Most Compelling Results from the space station in 2013; Engineering Development and Technology Maturation with a Focus on Commercial Applications and Exploration Applications; and Discoveries in Microgravity. The American Astronautical Society organized the event in cooperation with the Center for the Advancement of Science in Space (CASIS) and NASA.

By Jessica Eagan

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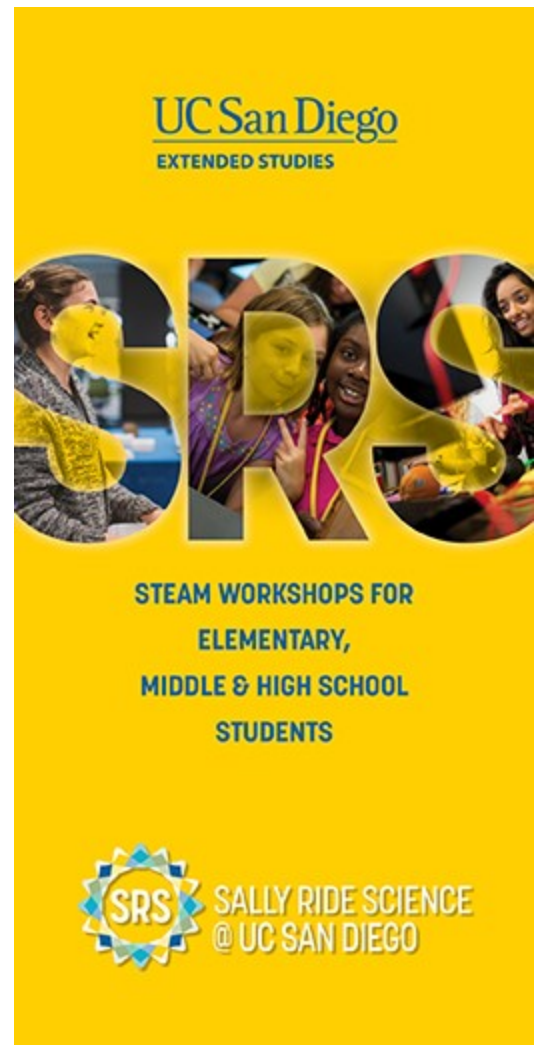
➦ Sally Ride EarthKAM to Receive Award at International Space Station Conference
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