

Hawaii students reaching for the stars...through aerospace



2008 NASA Robotics Academy

Windell Jones, UH Manoa, Mechanical Engineering

*Lunar Micro Rover Software for Inertial Navigation

Jordan Olive, UH Hilo, Aeronautical Engineering

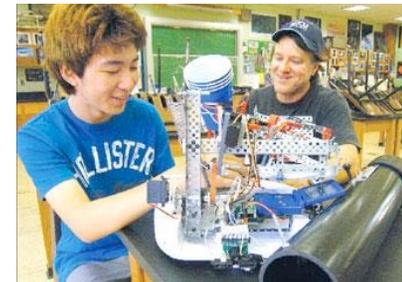
*Electrostatic discharge to repel lunar dust

Julian Yuen, MIT, Computer Science/Electrical Engineering

*On-Board Processing Applications for Robots/Rovers

Eisha Matsubara

Electrical Engineering
JPL, Electronic Ground Support



2008 NASA INSPIRE

Kelson Lau, Waiakea High School
*anti radiation electronics work group



Ben Honey, Aeronautical Engineer, Flight Controller trainee, NASA Johnson Space Center

A 24 year journey...the NASA Teacher in Space Project

- NASA Teacher in Space Project, 1984
- STS 51-L Challenger, January 1986



- International Challenger Center conference, Big Island, 1992, 150 teachers



- STS 118, Endeavour, Kennedy Space Center, August 2007



- Educator Astronaut Barbara Morgan, Hawaii, January 2008



The journey is complete....but the mission continues.

The beginning...U.S. Space Camp

1987-1992...500 students and 100 teachers



Star-Bulletin

Nanakuli youth sets his sights on distant stars

□ A student at Nanaikapono school plans to attend a NASA space camp in Huntsville, Ala.

By Hildegaard Verploegen
Star-Bulletin

When Reynolds Akau, 11, goes swimming off Nanakuli, he pretends he's an astronaut floating in space.

"I imagine I have my own ship. I'm journeying to unknown worlds," said Reynolds during an interview this week at Nanaikapono Elementary School.

He imagines those worlds as strange places with high mountains and red coloring like Mars, inhabited by aliens and very strange animals.

Reynolds' dreams started four years ago when he was in second grade.

"I read this moon book. It had pictures of astronauts training. I looked at it a long time," Reynolds said.

He didn't say it, but he hasn't been the same since. When Art Kimura, one of Hawaii's two teacher-in-space candidates, visited Nanaikapono to speak to students, Reynolds followed him around, begging to carry his equipment and maps.

Kimura gets hundreds of letters from Hawaii students but said the ones that started streaming in from Nanakuli struck a chord.

One letter, requesting astronaut pictures, started. "Dear Mr. Kimura, This is Reynolds, the one (who) is crazy about space."

For more than three years, Kimura got letters with questions about space books and pleas, "Help me to become an astronaut."

Kimura knew Reynolds dreamed of joining other kids to attend NASA's space camp in Huntsville, Ala.

But transportation and camp fees cost \$1,300.

"I tried for months to get money for him from Hawaiian organizations," Kimura said.

Reynolds, meanwhile, was plowing through books.

Reynolds Akau: At the age of 11, this Nanakuli youngster is looking toward outer space as a career.



Honolulu Star-Bulletin

QUOTABLE

■ "That was the greatest day I ever had."

— Reynolds Akau, 11, of Nanakuli, a Nanaikapono School pupil who learned Wednesday he'll be attending NASA's space camp in Huntsville, Ala., in March.



Reynolds passed away on his 15th birthday in 1992 but continues to inspire us.

DOE Space Conferences (ongoing legislative appropriation) facilitated standards based programs for teachers and students...1990-2004...Return to the Moon, International Mission to Mars, a Celebration of Flight, Mission to the Blue Planet, Rendezvous in Space, Marsville: the Cosmic Village



Future Flight Hawaii

18 years of using space to catalyze student interest in science, technology and the future
Office of Space Industry, DBEDT, 1991-1995; Hawaii Space Grant Consortium, 1995-present

Residential and day camps for 8,500 participants....return to the Moon, mission to Mars, Rendezvous in Space, celebration of flight, Mission to the Blue Planet

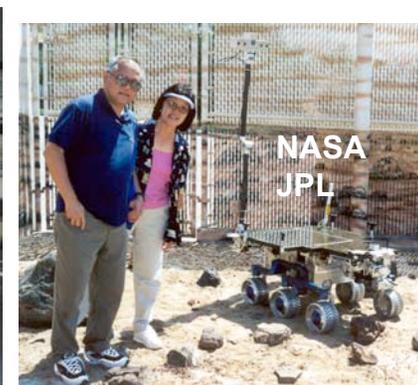


School presentations, family science nights and community outreach for 150,000 participants.....how to use the bathroom in space...Weird Science team



I touch the future...I teach....S. Christa McAuliffe, 51-L, Teacher in Space

Professional development for teachers...courses, workshops, conferences



supporting the continuing educational mission of Challenger

Challenger Center Hawaii



Astronaut Onizuka Space Center



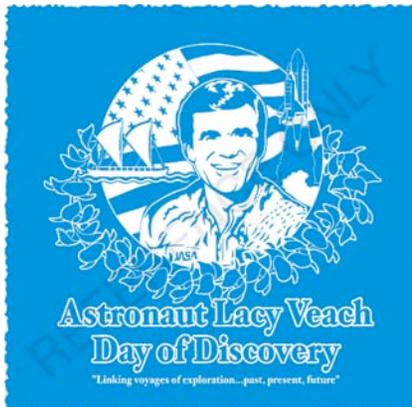
Initiated and coordinate annual community astronaut tribute days...9 years



Astronaut Onizuka Science Day, University of Hawaii at Hilo



Astronaut Lacy Veach Day of Discovery Linking voyages of exploration...past, present, future



From scholastic robotics programs to designing the next generation of rovers and spacecraft for the moon, Mars and beyond

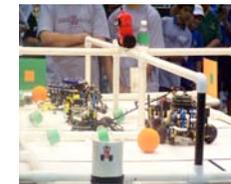
- **Elementary school programs**

- FIRST Lego League
- Junior FIRST Lego League



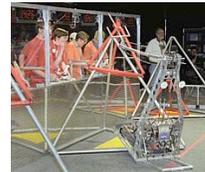
- **Middle school programs**

- FIRST Lego League
- Botball,
- Underwater ROV (HURC, BIRR)
- VEX



- **High school programs**

- FIRST Robotics Competition
- Botball
- Underwater ROV (HURC, BIRR)
- VEX
- Micro Robot



- **Robotics camps**

- *Future Flight Hawaii* (Maui)
- Hilo Youth Robotics (Hilo)
- Camp Eureka (Hilo)



Outcomes to date: over 250 robotics teams in Hawaii

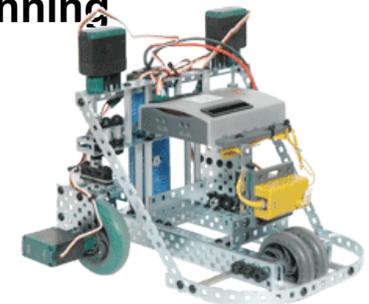
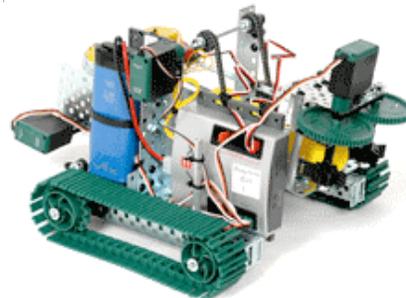
Honolulu hosts 1st Pan Pacific VEX Robotics International Championship, December 4-6, 2008

- **90-120 teams will compete in this world tournament which will include teams from Asia, the mainland United States and Hawaii (50 teams)**

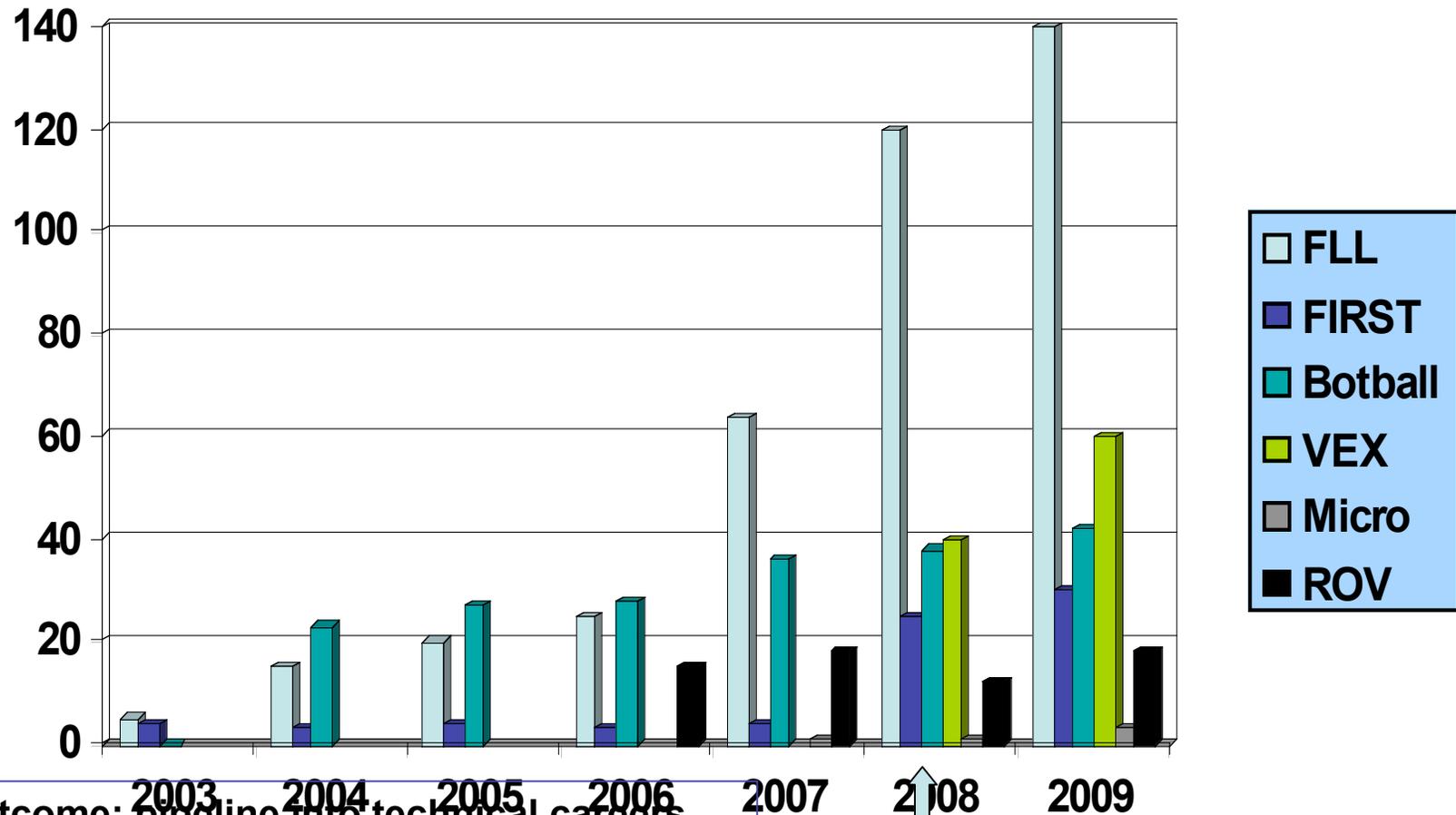
8/20/08: 20 teams from China registered among 43 teams to date

Shenyang Shashan No.4 Primary School, Beijing Shiyi School , Pearl Middle School China, The High School Affiliated to Renmin University, Beijing Xicheng District Changan Primary School, Fuxing Senior High School , Shanghai Xinhua Junior School, Nanjing Jinling High School , Jiangsu Suzhou Xingang School , Suzhou CYREA School, Huaiyin Middle School , Children Palace of Changzhou City , Changzhou Huangli School, Ivy Experimental High School , Changzhou Nanxiashi Primary School, Changzhou Wujin Luoyang Primary School, Hunan Xiangtan Qimeng School , No.2 Middle School of ChangDe City, No.2 Middle School of ChangDe City, Nanhai Shimen Experimental Middle School

- **Combines the excitement of sport with science and technology for middle and high school students.**
- **Alliance of two teams against another alliance of two teams, forging international partnerships and collaboration...measurement against a global standard**
- **Hawaii as center for scholastic robotics in the Pacific region...a beginning**



Goal: provide each school that would like to engage students in STEM through robotics with the opportunity and support—125+ public schools by 2009



Outcome: pipeline into technical careers, impact upon innovation, the economy, and security interests of the United States.

Act 111: supporting sustainability and growth of scholastic robotics

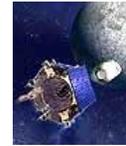


Sharing NASA resources and opportunities with teachers, students, and the community



- **NASA Quest Challenges are FREE Web-based, interactive explorations designed to engage students in authentic scientific and engineering processes.**

- **LCROSS Wayfinding
October-November 2008
(Grades 5-14)**



In this challenge, students will learn about navigation in the Polynesian tradition and how that relates to navigation in Space.

- **NASA curriculum, resources, teacher training**



- **NASA internships**

- **NASA INSPIRE (8 weeks for high school juniors and seniors)**
- **NASA Academy (10 weeks for high school seniors, college students)**



- **NASA Aerospace Services Project**

- **School visits, professional development**



We bring
NASA to the Schools



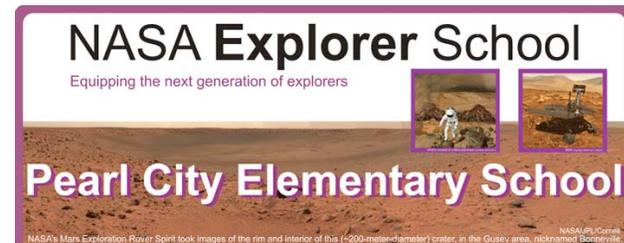
Recruiting and supporting the



- This "pipeline" strategic initiative promotes and supports the incorporation of NASA content and programs into science, technology and mathematics curricula in classroom grades 4-9 across the United States. Targeting underserved populations in diverse geographic locations, NASA Explorer Schools will bring together educators, administrators, students and families in sustained involvement with NASA's education programs.



- 2003: **Waimea Middle School** and **Chiefess Kamakahalei Middle School** selected as among first 50 Explorer Schools in the nation
- 2005: **Pearl City Elementary School** selected as one of 5 schools in NASA Ames region



Supporting programs in the community



After school programs, summer camps, teacher Workshops, school visits, customized programs



- *using *Future Flight* model, templates and resources for new Camp `Imiloa
- *providing part time specialist to assist in volunteer training, programs, new projects
- *making available *Future Flight* resources

STARBASE Hawaii (Keaau Armory) Hawaii Air National Guard



Aeronautics, rocketry, physical science, life skills for 5th graders



- *providing display and other resources as needed

Maui Space Science Camp....new

- *using *Future Flight* model
- *providing templates, resources



Touching the future...checklist

- **Leverage and support what already exists**
 - Empower through resources and funding and expand access statewide
 - ‘Imiloa Astronomy Center, Astronaut Onizuka Space Center, WCC Center for Aerospace Education, Challenger Center, Hawaii Space Grant Consortium (Future Flight Hawaii), Hawaii Space Flight Laboratory, STARBASE
- **Facilitate state wide project based learning programs through existing Space Conference funds** (previously appropriated by legislature)
- **Increase access to Challenger Learning Center**
 - Mobile lab for neighbor islands through use of virtual modes of interactive learning (video conferencing, internet/web based)
- **Support establishing additional STARBASE programs and centers on Maui and Kauai through the Hawaii Air National Guard**
- **Continue and increase support and leadership in scholastic robotics statewide**
- **Provide NASA sponsorship of the Pan Pacific VEX Championship**
- **Assure school access to NASA resources and programs through the Hawaii Space Grant Consortium and the Department of Education**
 - Internships, web based programs, grants, project based learning, professional development

Failure is not an option ... Gene Kranz, Apollo 13



Complex world demands more science in schools

The importance of science and technology to a competitive U.S. economy cannot be underestimated.

As our world becomes more technologically complex —and more reliant on technology to solve today's pressing problems — the demand for skilled scientists and engineers will continue to grow.

That's why we should pay attention to those who say we're not gaining ground in STEM (science, technology, engineering and math) education.

Even in these tough economic times, investing in our future remains important. And in the education arena, a focus on STEM programs is sure to yield a good return.

Inspiring and equipping the next generation of explorers through aerospace.