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*

**2008 NASA INSPIRE**

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

**Eisha Matsubara**  
Electrical Engineering  
JPL, Electronic Ground Support

**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

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

1st moon landing, Saddle Road, 1990
Future Flight Hawaii

18 years of using space to catalyze student interest in science, technology and the future

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 Xinggang 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
• 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
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 Kamakahelei 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
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.