



# Pre-Academy: Summary

Fostering Inspiration and Relevance  
through Science and Technology

**Peter Crouch, Dean**

**College of Engineering, University of Hawaii at Manoa**

# College of Engineering's Role

## Part of the College's Vision:

Workforce Engine – A College that delivers a growing proportion of the engineering and construction workforce needs to the State of Hawaii, across an increasing spectrum of engineering disciplines and is instrumental in attracting and retaining high wage jobs and companies in the State.

# Innovation in Education

- **January 2007 - Governor Lingle includes the Pre-Academy:** Fostering Inspiration and Relevance through Science and Technology in her newly introduced ....Innovation in Education Package.
- **2007 - State of Hawaii 24<sup>th</sup> Legislature** passed ACT 111 to establish the Pre-Academy, committing \$1.4 M for FY07-08 and FY08-09 including 9 FTE positions.

# Pre-Academy: Summary of Goals

- Serve middle school students with **experiences in Science, Technology, Engineering, and Mathematics (STEM)**
- **Encourage partnerships** with other relevant programs within the UH system, DOE, and public and private agencies
- Motivate and **engage students in STEM**
- Support the development of additional problem-based and applied learning experiences in STEM for **middle school teachers**
- Develop **evaluation measures**

# Major Funding Areas

- Pre-Academy
- Robotics and Problem-based Applied Learning Program
- Research Experiences for Teachers – Middle School

# Pre-Academy Support

- Provides **Administration/Management, Fiscal, and Personnel support**
- Examines strategies to leverage the research strengths and expertise at UH Manoa to create a **sustainable Pre-Academy Model**
- Currently developing the **STEM Intercommunity Portal** with support from the Office of the Vice Chancellor for Research and Referentia Systems

# Pre-Academy... Approach

**Capitalize** on the “creators of leading edge technology from one of the nation’s top 25 public research universities” . . .



Description from President McClain’s speech “UH at 100: Hitting Our Stride”

# Approach

. . . and **Leverage** exciting and mutually beneficial partnerships.



\$107,000 donation from BAE Systems to fund a FIRST Scholarship and a Kama`aina Come Home Scholarship.

# STEM Intercommunity Portal

**Join us!**  
The STEM Intercommunity Portal is built and maintained by educators, researchers, industry, and community members interested in promoting STEM and STEM education in Hawaii and around the world.

**User login**  
Username: \*  
Password: \*  
Log in  
Create new account  
Request new password

**Tag Cloud**  
artefact astronomy biology botany  
case College of Engineering community  
conservation education energy  
engineering environment  
ethnobotany EVENT events Hawaii  
horticulture K-12 lecture LOCAL (local)  
national Native Hawaiian culture ocean  
public event research robotics SCIENCE  
seminar SIP (site) STEM (stem) event  
sustainability technology UH  
University University of Hawaii

**Got Involved!**

**JOIN SIP TODAY!**  
*Joining is the easiest part!  
Jump in... the water is great!*

**FEATURED INTERNSHIPS**  
*Interested in Internships?  
Come right in!*

**SHARE and EXPLORE**  
*Start your own group  
and Share what you know!*

**STUDENT AND INDUSTRY CONNECTION**  
*The SIP STUDENT and INDUSTRY CONNECTION helps students explore STEM-related scholarships, internships and academic program opportunities in Hawaii and connect with other interns in similar fields.*

**THE SIP TEACHER CONNECTION**  
*The SIP TEACHER CONNECTION helps teachers connect with professionals in industry and academia to advance STEM-related curriculum in schools and allow professionals to offer research and technical ideas.*

**Frequently Asked Questions**  
Adding YouTube Video to Your Post  
Create a Group Discussion Page  
Creating Galleries  
How to Join a Group  
How to Post Documents  
How to Post Questions in "Q&A Area"  
How to Register on the SIP Site  
How to Start a Group  
How to Upload Video to YouTube  
Inserting Images into Your Post  
What are "Groups"?

**Recent Posts**  
IRES - 2010 Summer Research Study in Germany  
J (akagi)  
2010 Summer Transportation Internship Program for Diverse Groups (STIPDG)  
J (akagi)  
2010 NSF Research Experiences for Undergraduates Program  
J (akagi)  
2010 Summer High School Internship Program  
J (akagi)  
University of Hawaii at Manoa - Water Resources Research Center (WRRRC)  
f (awestington)

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College of ENGINEERING UNIVERSITY of HAWAII at MANOA referentia

Transforms the pre-academy into a network of networks by engaging the involvement of stakeholders from the university and its affiliates, industry, and the community including teachers

Vision: Cultivate relationships of exchange and collaboration, encourage a relevant global perspective, enable new opportunities for enrichment, and ultimately attract the interest and commitment of young people to join the growing STEM workforce.

# Sip-hawaii.org

The screenshot shows the Sip-hawaii.org website interface. At the top, there is a navigation menu with links for Home, About, Calendar, Organizations, Web Links, Groups, Galleries, Member List, FAQ, and Search. Below the menu, the main content area displays a group page for 'Robotics Workshop for RET Middle Schools - 12/04/2009'. The page includes a 'Join us!' section with a description of the STEM Intercommunity Portal, a 'User login' section with fields for Username and Password, and a 'Tag Cloud' with various STEM-related tags. The main content area features a 'DISCUSSION PAGE' titled 'Robotics In Education and Practical Applications in Engineering - Mr. Jason Akagi', which includes a video player showing a presentation by Mr. Jason Akagi from Spectrum Photonics Inc. The page also has a 'Log in or register to post comments' link and a 'Read more' link.

- Web Portal tools and priorities are driven by Stakeholder developed “use cases.”
- Stakeholder group evolves as site develops.

Group page managed by the Lyon Arboretum



A teal circle is partially visible on the left side of the slide. A dark brown bracket is on the left, and a teal bracket is on the right, both framing the title area.

# Pre-Academy: **Robotics**

Fostering Inspiration and Relevance  
through Science and Technology

Song K. Choi, Assistant Dean  
College of Engineering, University of Hawaii

# Pre-Academy: Robotics

- Coordination of Pre-Academy Robotics:

Song K. Choi, Assistant Dean, CoE, and  
Arthur Kimura, Director, Future Flight, SOEST

- Part-time electrical engineering specialist:

Riley Ceria, Technical Mentor

# Scholastic Robotics Competitions

Competitions supported by ACT111 funding:

- HI Underwater Robot Challenge – 20 teams (30+ total)
- Big Island ROV Regional – 15 teams (20+ total)
- Botball – 20 teams (40+ total)
- VEX – 50 teams (100+ total)
- FIRST Lego League – 53 teams (130+ total)
- FIRST Robotics Competition – 7 teams (37 total)
- Micro Robot Maze Competition – 4 teams (63 total)
- Robofest – 30 teams (50+ total)

These are annual national and international competitions.



# Scholastic Robotics Competitions

Exciting!



Engaging!



Challenging!

Rewarding!

# Seed Programs and Mentor Training

- Mentors, Volunteers and Consultants
  - Strengthens reputation and community relations
  - Builds technological literacy
  - Pipeline for interns and future employees
  - Motivating volunteer opportunities for employees
  - Applied professional development for employees



# Seed Programs and Mentor Training

- Teacher, Mentor, & Student Workshops:
  - FRC Workshops for 52 public school teams
  - VEX workshop for 42 teachers and over 60 students
  - Two day Botball workshop for team mentors and students for 38 teams
  - Big Island ROV teacher and student workshop
  - FIRST Robotics Competition mentor and teacher workshops
  - First Lego League Workshop – 20 teachers & 60 students
  - Coordinated robotics personnel and robotics program leaders for mentor visits in schools

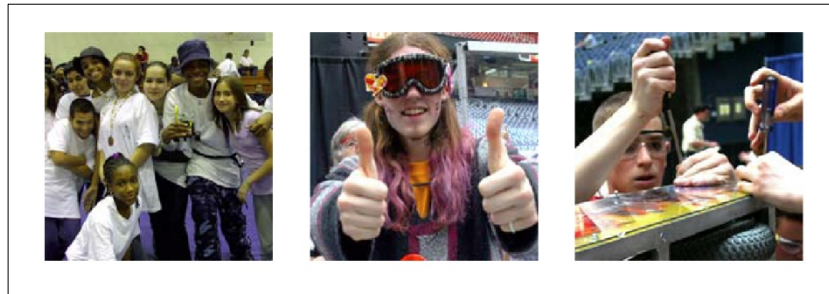
# Robotics program continues to:

- Expand the reach and impact of scholastic robotics competitions
- Partner with DBEDT and Hawaii Space Grant to identify and support under represented and under served school complexes
- Collaborate with project stakeholders to broaden development of robotics outreach via presentations, demonstrations and mentorships

# Statement of Impact!

The overall goal for the Robotics Program of ACT 111:

- to enhance student interest in in K-12 STEM curriculum by maximizing HI State participation in in national and international scholastic robotics tournaments
- to significantly increase the science and engineering workforce within the State and the nation



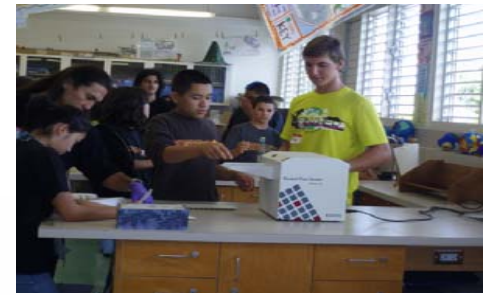
Increased current interest and participation has directly impacted the number of students who have gone on to engineering programs.

# Research Experiences for Teachers Middle Schools



“A teacher driven model for advancing engineering, science, technology and mathematics in Hawaii’s Middle Schools”

# *FIRST Pre-Academy Current Participants (35 Schools)*



# FIRST Pre-Academy Program Accomplishments



- Delivered laptop computers, scientific measurement probes, wireless communication devices, and other leading-edge technologies to participating middle schools
- Delivered hand-on lessons and multimedia covering a wide range of STEM topics
  - e.g. electromagnetic spectrum, wave propagation, ocean acidification, random sampling, ...
- Teacher-driven lessons and activities developed using program's leading-edge technology
- Held quarterly Mini Workshops for participating teachers covering a range of STEM topics
  - e.g. Personal Digital Assistants, Robotics, Sustainability

# Pre-Academy – Mini Workshops

(continued)



## ➤ Mini Workshop on Sustainability at Honolulu Community College

- Local and global sustainability issues presented by university researchers
- Environmental projects presented by participating teachers
- Hands on laboratories, lesson-plan sharing and collaboration and RET team-building

## ➤ Mini Workshop on Robotics at Manoa Innovation Center

- Robotics research and applications presented by university and industry
- School robotics programs presented by participating teachers
- Hands-on demonstrations, UH graduate research, teacher collaboration and RET team-building

# FIRST Pre-Academy – Curriculum and programs

RET program has helped the teachers to develop new STEM based curriculum covering a broad range of topics such as:

- Water quality testing
- Robotics
- Electromagnetics
- Wireless Sensors
- Erosion and Climate Study
- PDAs



# FIRST Pre-Academy – Curriculum Sharing

- Organize Teacher Training and Collaboration Workshops
- Provide sensors, science kits and other technology infrastructure for sharing among schools
- Technical & Research support to teachers
- STEM Intercommunity Portal as a platform for online sharing and collaboration



Bring Leading-Edge Technology Into Classrooms

Qualified High-Tech Workforce in Hawaii

Leading-Edge Technology and  
Hands-On Classroom Applications

Support Teacher-Driven  
STEM Activities

Address STEM Needs

**ACT 111**

Provide Infrastructure  
and Multimedia Assets

Teacher Retention

Teacher-Driven  
STEM Activities

Partnerships  
with Industry

Partner with Industry Professionals

Economic Development in Hawaii

