Pacific Alliance for Supporting Individuals with Disabilities in STEM Fields Partnership: Five Years of Findings

Presentation at the Pacific Rim International Conference on Disability & Diversity

May 19, 2014

Funded by National Science Foundation HRD #09-29079
Overview

- About the Project
- Project Implementation & Accomplishments
- On Communities of Practice
- On Academic and Career Support
- On Mentorship Program
- Results of Pacific Alliance Project
- Student Success Stories
- Questions & Answers
Background

- STEM careers increasing in Hawai`i
- K-12 and postsecondary emphasis on STEM education
- In 2007, only 18.1% of working age individuals with disabilities had bachelor or higher degrees compared to 30.4% of individuals of working age w/out disabilities
- For people aged 21 to 64, only 44% of people with disabilities are employed, compared with 80% of individuals without disabilities in Hawai`i

Source: Research and Training Center on Disability Demographics and Statistics (2008), Retrieved from http://www.ilr.cornell.edu/EDI/p-srrtc.cfm
Project Goal:
Increase the numbers of students with disabilities (SWD) in STEM postsecondary education programs and ultimately the STEM workforce in Hawaiʻi.

Project Outcomes:

1. Increased graduation rates of SWD in degreed programs (associate, baccalaureate, and graduate degrees); and
2. Increased rates of SWD entering STEM employment with a STEM degree.
Critical Junctures & Supports

Evidenced Based, Theory Based, & Promising Practices

Mentoring
*Disability Specific & STEM Specific*
1. Accommodation/self-advocacy
2. Assistive Technology use
3. Interest & embedded STEM building
4. STEM area role model

Academic
5. Basic academic skill development (Learning Progressions)/Scaffolding
6. STEM specific academic supports
7. College preparation
8. Individualized advising in STEM

Career -Related
9. Paid internships
10. Research experience/Transition
11. Supports
12. Employment accommodations
Development Phase of the Project

Initial focus of the project:

1. Identification of needs of students with disabilities at the three college campuses in the UH System;

2. Development of “communities of practice” on each campus; and,

3. Focus on “feeder” high school students with disabilities to engage them in activities building their interest in STEM fields and postsecondary education.
Progress Made By Year Five

1. 17 Oahu high schools and 5 University of Hawaii System colleges are involved in the Pacific Alliance project.

2. 4 Communities of Practice were established to engage administrators, faculty, student services, students with disabilities and communities to work towards attaining the project goal.

3. 322 total number of participating students with disabilities.
Who Are Our Students?

Figure 1: Student Participants by Disability Type

- Asperger, Autism, 11%
- Psychological, Psychiatric, 8%
- Physical, Orthopedic, Mobility, 6%
- Blind, Visual, 4%
- Systemic Health, Medical, 4%
- Deaf, Hearing, 2%
- Speech, 2%
- Acquired TBI, 2%
- ADD, ADHD, 24%
- Learning Disorder, 24%
- Other, 13%

Total number of student participants over the 5 years: 322
* Some students report more than 1 disability type.
Established Supports & Activities

- Academic Supports
- Mentorship program (Mentoring & Mentor Trainings)
- Interest Building
- Monthly sessions for both college and high school participants
- Monthly office hours for college participants
- Internship program for college participants
- Comprehensive Website: [www.cds.hawaii.edu/pacificalliance/](http://www.cds.hawaii.edu/pacificalliance/)
Events Implemented

- Summer Academic Camp (2012, 2013)
- Assistive Technology Demonstrations
Other Activities

- Pacific Alliance Webinar
- Pacific Alliance ListServ to inform Advisory Board members, COP members, interested faculty, staff, and community members
- Communities of Practice Toolkit
- Mentoring Handbook
- Internship Manual
- Pacific Alliance Website
Sustainability of the Project

- Shifting of events to be held at each college campus and to be facilitated by COP members
- Providing individual campus booklets with compiled resources for high school students
- Maintaining Pacific Alliance website
  - Hyperlinks to each individual college campus website for information
- Establishment of scholarship fund at Windward Community Colleges.
Communities of Practice
What are Communities of Practice (COP)?

- COP is an evidence based practice where teams of people who share a concern or a passion for “something” they do, work together to learn how to do it better as they interact regularly (Wegner, McDermott, & Snyder, 2004).

- COPs
  - set priorities
  - cultivate resources
  - assess results
  - interact regularly
Pacific Alliance COPs

4 COPs

1. UH Manoa-Kapiolani Community College
2. Honolulu Community College
3. Leeward Community College
4. Windward Community College

Each Pacific Alliance COP has the same goal, but is unique to the campus.
Pacific Alliance COPs

All COPs…

- represent a balance of members connected to a specific campus;
- share interest and concerns students with disabilities (SWD) in STEM fields;
- identify barriers to participation in STEM fields for SWD; and,
- improve opportunities, resources, and support for SWD interested in STEM fields.
<table>
<thead>
<tr>
<th>University of Hawaii Manoa (UHM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Learning Assistance Center (Faculty)</td>
</tr>
<tr>
<td>• College of Engineering (Dean)</td>
</tr>
<tr>
<td>• College of Tropical Agriculture and Human Resources (Dean)</td>
</tr>
<tr>
<td>• Center for Microbial Oceanography Research and Education (Faculty)</td>
</tr>
<tr>
<td>• Counseling Services (Faculty)</td>
</tr>
<tr>
<td>• Career Services (Faculty, UHM)</td>
</tr>
<tr>
<td>• Online Learning Academy (Faculty)</td>
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<tr>
<td>• John A. Burns School of Medicine (Faculty)</td>
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<tr>
<td>• Others</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Kapiolani Community College (KCC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Academic Affairs (Dean)</td>
</tr>
<tr>
<td>• Mathematics (Faculty)</td>
</tr>
<tr>
<td>• STEM Center (Staff &amp; Faculty)</td>
</tr>
<tr>
<td>• Others</td>
</tr>
</tbody>
</table>
Honolulu Community College COP

Honolulu Community College (HCC)

• Undergraduate Programs (Dean)
• Farrington High School Transition (Hawai‘i Department of Education Teacher)
• Outreach/Recruiter (Faculty)
• Disability Services (Director)
• Student Affairs (Dean)
• TRIO – Student Support Services (Director)
• STEM Native Hawaiian (Staff)
• Mathematics (Instructor)

Jolene Suda, HCC COP member
Leeward Community College COP

Leeward Community College (LCC)

- Student Affairs (Dean)
- Mathematics (Department Chair/Professor)
- STEM Native Hawaiian Counseling Services (Staff)
- Financial Services and Aid (Director)
- Disability Services (Faculty)
- Chemistry and Physics (Professor)
- STEM Counseling Services (Staff)
- Outreach (Recruiter)

Professor Michael Reese, LCC COP Member
Windward Community College COP

Windward Community College (WCC)

• Chancellor
• Academic Affairs (Vice Chancellor)
• Academic Affairs, Division I & II (Deans)
• Physics, Astronomy and Mathematics (Professor)
• Biology (Assistant Professor)
• Disabilities/Admissions Counselor; Early Admit and Running Start Counselor
• Assistive Technology Specialist
• First Year Experience (Counselor)
• Special Education teacher; Transition Coordinator
• Pacific Alliance WCC intern/WCC student
COP Activities

- Bi-annual meetings
- Meetings consisted of working on a “Resource Map”
- Planning Events
- Discussing challenges, new developments, changes on campus that could affect SWD in STEM fields
- Surveys to measure change
Academic & Career Support
## Academic and Career-Related Support & Activities

<table>
<thead>
<tr>
<th>Academic</th>
<th>Career Related</th>
</tr>
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<tbody>
<tr>
<td>Basic academic skill development/scaffolding</td>
<td>Paid internships</td>
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<td>STEM specific academic supports</td>
<td>Research experience</td>
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<td>Individualized advising in STEM</td>
<td>Transition supports</td>
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<tr>
<td>College preparation</td>
<td>Employment accommodations</td>
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</tbody>
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Pacific Alliance

Science, Technology, Engineering, & Mathematics Postbaccalaureate Education for People with Disabilities
Resources for Students

Students are connected to...

- Tutoring services on campus
- Online tutoring services
- Other tutoring
- Stipends
- Academic and personal counseling
- Disability services on campus
- Assistive technology

Pacific Alliance
Examples of Academic Supports

Direct Support in Reading, Writing & Math

- Winter Institutes & College Readiness
- Summer Academic Camp
- Pacific Alliance College Semester sessions
To Develop Students’ Interests in STEM fields…

- Students learn about different STEM events and attend the events individually or as a Pacific Alliance field trips.
- Conduct hands-on learning experiences

It’s important to expose students to different types of STEM experiences to build their interests in STEM!
Some Examples

Learning about insects at the Insect Museum at UH Manoa and experimenting with termites.

Professor Roger Kwok conducting a hands on activity in physics with Pacific Alliance students.
More Examples

- Students learned the importance of Computer Assisted Design (CAD) technology in various STEM professions and made their own “gears” through SolidWorks software.

Collin Kobayashi, of 3-D Innovations lead the instruction.

Student end product made with SolidWorks software.
STEM Career Opportunities

• Students are connected to internships and externships.
  • Internship opportunities are updated on the Pac Alliance website
  • Students learn to prepare their resumes
  • Practice interviews
  • Career services and career counselors sponsor mini-sessions for Pacific Alliance participants.
  • 36 students participated in internships/externships
Pacific Alliance Interns

- Pacific Alliance implemented a competitive internship program in 2013. The internship program helps develop selected Pacific Alliance participant college students by increasing:

1. Communication, organization, teamwork, time management skills;

2. Peer mentor and leadership skills;

3. Their confidence levels;

4. Providing opportunities to interact in events and present at conferences.
2014 Spring Pacific Alliance Interns
Pacific Alliance Mentoring Program
What is Mentoring?

1. Mentoring is a way to learn a variety of personal and professional skills from individuals who support and encourage growth.

2. Mentoring is a dynamic, reciprocal, long-term formal, or informal, relationship that focuses on personal and/or professional development.

3. In mentoring, a mentor is a sounding board and guide. Mentors provide perspective and resources and ask thought-provoking questions.

4. In the ideal mentoring relationship, mentors and mentees or protégés learn and teach each other.

How does Mentoring Work?

• For individual mentoring, students who are participants in the project can request a mentor. The participants can also become a mentor for other participants.

• Mentoring coordinator matches the mentee to a mentor, who is trained on mentoring, based on mentee requests, and mentor experience, education, personalities, and knowledge about working with individuals with disabilities. Number of mentor-mentee matches are shown Slide 10.
For group mentoring, the project staff invite role models in STEM fields, conduct hands on activities related to STEM, and conduct self-advocacy and assistive technology sessions.
Types of Mentoring Communications

- Email
- Phone
- Face-to-Face
- One-to-one mentoring
- Electronic/virtual
- Group mentoring
- Peer mentoring
Mentor in Action
Types of Mentoring Support

1. **Academic**: For example, with math, assisting a mentee to understand how s/he might adapt to accessing the information in light of a given disability.

2. **Transition**: From high school to college or community college; from community college to university; from undergraduate school to graduate school; or from schooling to employment.

3. **Social skills**: How to get along with peers; how to adapt to shyness; and how to start a conversation, as examples.
4. **Life Skills**: For example, money management, accessing resources; applying to college; resume-building.

5. **Role Models**: Mentors in general serve as role models, and some mentors present to high school and other groups, as role models.
Participants of first High School Special session, Pacific Rim International Conference, 2011, with STEM role model and a speaker Tyrone B. Hayes, Professor of Integrative Biology at the University of California-Berkeley.
## Total Number of Mentees

<table>
<thead>
<tr>
<th>Mentee Status</th>
<th>Number of Mentees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Mentees</td>
<td>41</td>
</tr>
<tr>
<td>Total High School Mentees</td>
<td>14</td>
</tr>
</tbody>
</table>
Total Mentees by Colleges

Number of Mentees by College

<table>
<thead>
<tr>
<th>College</th>
<th>Number</th>
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<tbody>
<tr>
<td>HCC</td>
<td>6</td>
</tr>
<tr>
<td>KCC</td>
<td>8</td>
</tr>
<tr>
<td>LCC</td>
<td>4</td>
</tr>
<tr>
<td>WCC</td>
<td>4</td>
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</table>
# Total Mentoring Stats

<table>
<thead>
<tr>
<th>Category</th>
<th>Stats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mentees who moved from high school to college</td>
<td>4</td>
</tr>
<tr>
<td>Mentees who have moved through system to UH-M</td>
<td>7</td>
</tr>
<tr>
<td>Total Mentor Matches</td>
<td>41 mentees matched with 48 mentors</td>
</tr>
<tr>
<td>Current Mentor Matches</td>
<td>20 mentees matched with 25 mentors</td>
</tr>
</tbody>
</table>
Total Mentoring Stats (continued)

Total Mentors: 56

Current Mentors: 33

Mentor Trainings Total: 28 Trainings on 9 topics

Archived Mentor Trainings: 5
Mentor Training Topics

1. “Introduction to the Pacific Alliance Mentoring Program:” How the Pacific Alliance mentoring program works.

2. “Laws, Tools and Culture:” Discussion of IDEA, ADA, 504, cultural characteristics and mentoring tools.

3. “What If’s”, Role Play, and Seeing Beyond Images:” A focus on scenarios and role playing different mentoring situations.

4. “Understanding Learning Disabilities:” Discussion and descriptions of different types of LD.
5. “Best Practices in Mentoring for Persons Sustaining Traumatic Brain Injury:” Descriptions of brain injuries and working with individuals who have sustained a TBI.


8-9. Confidential discussions
Comments from the Field

*Mentee:*

“My mentor helped tremendously. While she does not interfere with my personal life, she has listened to me and has helped my organize my thoughts about school such that I can feel stronger and apply the same techniques to my personal life - she listens to me but does not make or influence my decisions. ”

*Mentor:*

“I'm ‘grateful’ for all the activists who challenged the powers that be so that I can have accessible sidewalks, buses, etc.”
What Have We Learned about Mentoring?

1. It’s even more important than we thought.
2. There are many different ways for mentoring to work.
3. Changes may not show up quickly (but they might).
4. The most important factor is the mentee-mentor relationship.
5. If the mentee doesn’t want to follow through, the match will not work.
6. If a mentor cannot be found, the match will not work.
7. More emphasis could have been placed on mentees.
What’s Next

Pacific Alliance Mentoring Program:
http://www.cds.hawaii.edu/pacificalliance/mentors/

Watch for Handbooks…. 
Results of Pacific Alliance

From year 1 to year 4 1/2
1. Factors affecting the evolution of the project

1. Contextual Change
   (1) Funder’s Feedback
       Annual site visits by the expert panelists and project officer
       Annual and interim reports
   (2) COP context
       New STEM related degree programs, initiatives

2. Participants’ Needs
   (1) Individual students’ needs for support
   (2) Sub-group needs for support (e.g., high school students, graduates, postsecondary students)
2. The extent to which the project has increased the number of participants
## Recruitment strategies and sources

<table>
<thead>
<tr>
<th>Source</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professors/instructors/teachers</td>
<td>62.8%</td>
</tr>
<tr>
<td>Mentors/counselors</td>
<td>21.3%</td>
</tr>
<tr>
<td>Peers</td>
<td>9.5%</td>
</tr>
<tr>
<td>Brochures/flyers</td>
<td>6.6%</td>
</tr>
<tr>
<td>New student orientation</td>
<td>5.7%</td>
</tr>
<tr>
<td>Student support office</td>
<td>3.03%</td>
</tr>
<tr>
<td>Other activities/projects</td>
<td>2.3%</td>
</tr>
<tr>
<td>Disability services office</td>
<td>2.3%</td>
</tr>
<tr>
<td>Advocacy groups</td>
<td>1.3%</td>
</tr>
<tr>
<td>Vocational rehabilitation office</td>
<td>1.0%</td>
</tr>
</tbody>
</table>
3. Participation in academic support

<table>
<thead>
<tr>
<th></th>
<th>Spring 2010-Fall 203</th>
<th>Basic academic development / scaffolding</th>
<th>STEM specific academic supports</th>
<th>College preparation</th>
<th>Individualized advising in STEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Freq.</td>
<td>292</td>
<td>33</td>
<td>135</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Total # students</td>
<td>123</td>
<td>33</td>
<td>114</td>
<td>18</td>
<td></td>
</tr>
</tbody>
</table>

**Satisfaction**
(1) Basic academic development: 71.2%
(2) STEM specific support: 80%
(3) College preparation: 71.4%
(4) Individualized advising in STEM: 71.3%
## Satisfaction

1. Being a mentor: 85.7%
2. Accommodation: 68.1%
3. Self-advocacy: 72.8%
4. AT: 63.3%
5. Hands-on STEM activities: 69.4%
6. STEM Role model: 73.9%
7. Other: 72.7%

### Participation in mentoring support

<table>
<thead>
<tr>
<th>Spr. 2010-Fall 2013</th>
<th>Mentor</th>
<th>Accommodations</th>
<th>Self-advocacy</th>
<th>Assistive tech</th>
<th>Hands-on STEM activity</th>
<th>STEM Area Role Model</th>
<th>Other Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Freq</td>
<td>45</td>
<td>79</td>
<td>274</td>
<td>128</td>
<td>609</td>
<td>200</td>
<td>268</td>
</tr>
<tr>
<td>Total # swd</td>
<td>28</td>
<td>39</td>
<td>155</td>
<td>107</td>
<td>440</td>
<td>152</td>
<td>184</td>
</tr>
</tbody>
</table>
Participation in career support

<table>
<thead>
<tr>
<th>Spr 2010-Fall 2013</th>
<th>Connected to internship</th>
<th>Paid internship</th>
<th>Learn about career</th>
<th>Company visits</th>
<th>Job shadow</th>
<th>Transition support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Freq.</td>
<td>4</td>
<td>39</td>
<td>15</td>
<td>28</td>
<td>33</td>
<td>200</td>
</tr>
<tr>
<td>Total # of stu.</td>
<td>2</td>
<td>26</td>
<td>14</td>
<td>28</td>
<td>30</td>
<td>190</td>
</tr>
</tbody>
</table>

Satisfaction
(1) Connected to internship: 62.8%
(2) Paid internship: 75%
(3) Learn about career building: 65.3%
(4) Company visit: 61.1%
(5) Job shadow: 76.5%
(6) Transition support: 64.9%
4. Project short-term outcomes

As a result of participating in the project,

(1) 62.0% of participants reported an increase in their STEM interest.

(1) 57.4% of participants reported an increase in their STEM academic aspiration.

(2) 58.8% of participants reported an increase in their STEM career aspiration.
(1) 68.2% of high school graduates - definitely helpful or helpful in entering college.
(2) 43.8% of high school graduates - definitely helpful or helpful in deciding to major in STEM at college.
6. Project outcome 2: Postsecondary participants graduating with a degree in STEM

<table>
<thead>
<tr>
<th></th>
<th>Yr 1</th>
<th>Yr 2</th>
<th>Yr 3</th>
<th>Yr 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA/AS in STEM or Transfer to a University to Major in STEM</td>
<td>0</td>
<td>2</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>BA/BS in STEM</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Graduate Degrees in STEM</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

(1) Average participation duration
AA/AS - 4 semesters
BA/BS - 6 semesters
AA/AS then BA/BS - 8 semesters

(2) Gender
AA/AS - Male: Female = 2:1
BA/BS - Male: Female = 1:1
(3) Disability type
a. Associate’s: 4 psychological; 2 ADHD; 2 physical; 1 learning; 1 health; 1 visual; 1 speech
b. Bachelor’s: 4 psychological; 3 physical; 3 learning; 2 ASD; 2 ADHD; 1 speech; 1 other
c. Associate’s then Bachelor’s: 3 psychological; 2 ADHD; 2 physical; 1 learning; 1 speech.

(4) Significant difference in the participation in mentoring activities by student degree status
Associate’s to Bachelor’s (35 times) > Bachelor’s (33 times) > Associate’s (6 times) and No degree (7 times)
(5) Significant difference in the participation in career activities by student degree status
Bachelor’s (6 times) > Associate’s (5 times) > Associate’s then, Bachelor’s (2 times) and No degree (1 time)

(6) Persistence in postsecondary STEM programs
a. Enrolling in PA freshman year was positively correlated with completion of attempted courses overall and STEM course specifically.
b. In the cohort time-series study of CC participants, 31% were on track to complete at least 60 credits and/or an AS degree in 2 years, which is a higher rate than the rate of UH CC (13%).
7. Project outcome 3: Employment of participants in STEM

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full-Time in STEM</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Part-Time in STEM</td>
<td>0</td>
<td>2</td>
<td>6</td>
<td>9</td>
</tr>
</tbody>
</table>

In Year 4, there are 19 students who did an internship in STEM. These students will graduate soon, so there is a possibility to increase the student employment.
Pacific Alliance Student Success Stories
“John”

- John became a Pacific Alliance participant while a senior in high school at Leeward side high school.
- John’s disability is autism.
- John attended summer academic camp when making the transition from high school to University of Hawaii at Manoa.
John’s progress

- John had a mental health provider provided by the State of Hawaii. Prior to the mental health provider’s services ending, John arranged a meeting between the Pacific Alliance project coordinator, himself and the State mental health provider.

- The Pacific Alliance project coordinator was able to inform John and his mental health provider resources on campus that could help John manage his anxiety and stress.
“Laurie”

- Laurie became a Pacific Alliance participant while taking some courses at a Community College and University of Hawaii, Manoa.

- Laurie’s disability is Asperger's and learning disabilities.
Laurie’s Progress

- Currently Laurie is a graduate student on the mainland, concentrating on an advanced degree in Biology and continues to be a Pacific Alliance participant.

- Laurie has developed her self-advocacy skills and reaches out to Pacific Alliance staff members from time to time to help her with résumé development, interviewing skills, and cover letters.

- Her continued communication with Pacific Alliance staff is through skype, email, and telephone calls.
“Ron”

- Ron is a student at Community College.
- He has multiple physical and learning disabilities.
Ron’s Progress

- Ron became a Pacific Alliance participant in 2012 while attending Community College.
- He is studying to become a Medical Lab Technician.
- Ron has attended numerous Pacific Alliance events including summer academic camp and winter institutes for college students.
- Ron struggled through chemistry and exhausted all tutoring resources at his campus and informed Pacific Alliance staff. He worked with a mentor through Pacific Alliance and passed his chemistry class to continue in his program.
In their own words

Video
Questions & Answers
# Contacts

<table>
<thead>
<tr>
<th>Name</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kelly Roberts</td>
<td><a href="mailto:robertsk@hawaii.edu">robertsk@hawaii.edu</a></td>
</tr>
<tr>
<td>Kiriko Takahashi</td>
<td><a href="mailto:kiriko@hawaii.edu">kiriko@hawaii.edu</a></td>
</tr>
<tr>
<td>Hye Jin Park</td>
<td><a href="mailto:parkhye@hawaii.edu">parkhye@hawaii.edu</a></td>
</tr>
<tr>
<td>Lisa Uyehara</td>
<td><a href="mailto:uyeharal@hawaii.edu">uyeharal@hawaii.edu</a></td>
</tr>
<tr>
<td>Steve Brown</td>
<td><a href="mailto:sebrown@hawaii.edu">sebrown@hawaii.edu</a></td>
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Visit us at: [www.cds.hawaii.edu/pacificalliance/](http://www.cds.hawaii.edu/pacificalliance/)