

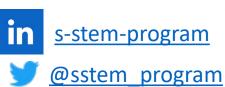
Scholarships in STEM (S-STEM)



Webinar: Effective Practices and Innovations for S-STEM Student Success at Minority-serving Institutions

April 6, 2023 3:00-4:00 p.m. ET









Agenda

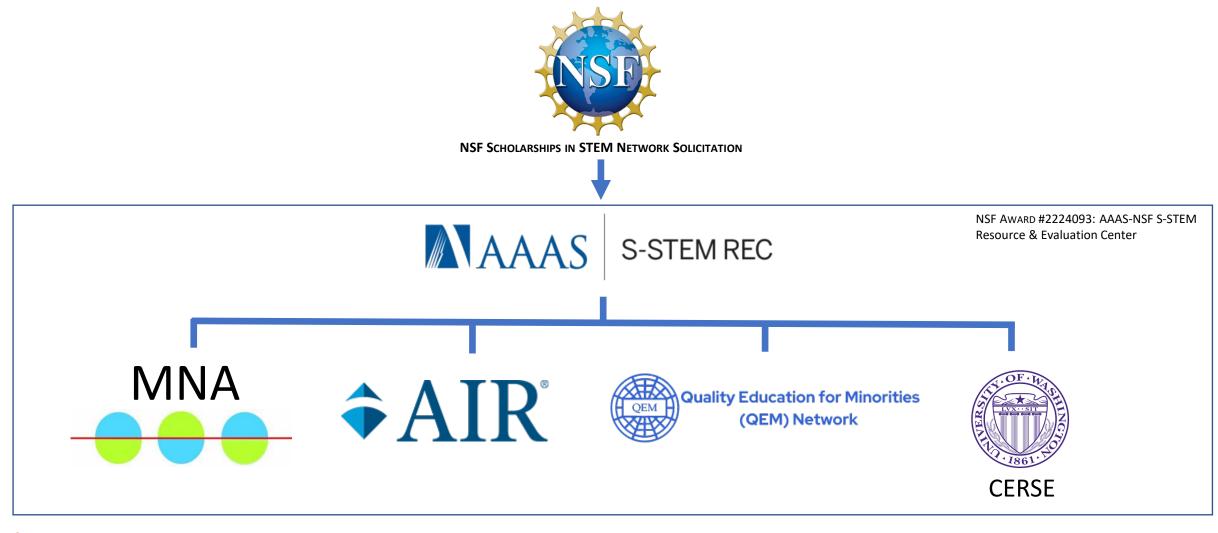
 Overview of the AAAS S-STEM Resource & Evaluation Center (S-STEM REC) and Webinar Objectives

S-STEM Grantees Panel Discussion

• Q&A

Upcoming Events and Resources

Who We Are: S-STEM Resource & Evaluation Center (REC)



NSE

This material is based upon work supported by the National Science Foundation (NSF) under Grant No. DUE-2224093. Any opinions, findings and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the NSF.

S-STEM REC Vision

The AAAS S-STEM Resources & Evaluation Center (REC) seeks to cultivate a network of S-STEM stakeholders and further develop the infrastructure needed to promote the exchange of ideas, resources, opportunities, and knowledge related to the effective strategies and practices to increase the number of talented low-income students obtaining degrees in STEM and entering the STEM workforce.

AAAS S-STEM REC Goals



To **build the capacity of S-STEM Network programs** by identifying program leadership needs and supporting their growth by leveraging context-conscious support, communication, resources, and knowledge across S-STEM projects with the aim of increasing their program effectiveness.



To **build the capacity of S-STEM Scholars** through professional development and connection to career-building opportunities aimed at increasing their ability to successfully navigate pathways into the STEM workforce or graduate studies.



To increase the effectiveness of the S-STEM portfolio by synthesizing evidence of outcomes and impacts across the entire network and disseminating those findings to support evidence-based decision-making across the STEM ecosystem to increase the access and success of academically talented students from low-income backgrounds.







1.Mixed Methods Approach

2.Released in Y3 & Y5

Webinar Objectives

Share effective strategies for engaging low-income students.

 Increase awareness on the value of partnerships in enhancing S-STEM scholars' experiences.

Elevate S-STEM projects experiences and outcomes at different contexts.

Meet Our Panelists



Dr. Elizabeth AdamsProfessor of Engineering and Technology
Cuesta College



Dr. Mohammed QaziProfessor of Mathematics *Tuskegee University*



Dr. Helen TurnerProfessor of Biology and Data
Science, and Research Director of
United Nations Sustainability
Center
Chaminade University of Honolulu

Fresno City College Engineering Scholars Program

Elizabeth Adams, PhD, PE

Best Practices and Innovations for S-STEM Student Success at Minority Serving Institutions

NSF S-STEM REC Capacity Building at MSIs Webinar Series April 6, 2023



Background and Goals

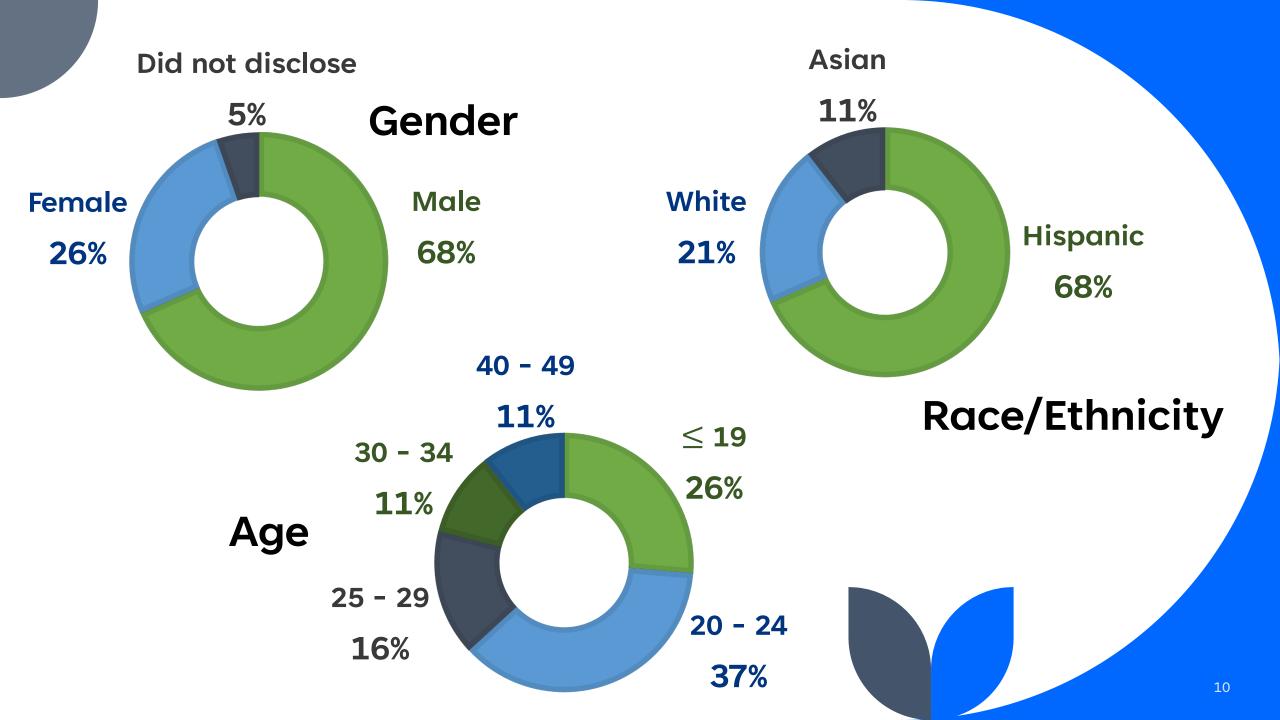
Increase engineering degree and/or certificate completion rates at FCC

Accelerate student progression through the engineering curriculum at FCC, reducing average time to degree or transfer

Increase 2- and 3-year engineering transfer rates from FCC to four-year institutions







Program Components



Undergraduate Research



Flood Protection Plan (CVFPP) was updated once again b

Protection Board to better prepare for similar events.

Updated by: Jacob Draper, Anissah Saad, Isaac Lara, Nathan Franco, Jeffrey Winters, and Nathan

Gonzalez Advisors: Dr. Ahn, Dr. Orfi, Mrs. Gutierrez

Remote Sensing

Photogrammetry

- GIS
- Sociological Perspective
- **Ethics**



- largest drought in its history
- Due to the lack of water, farmers had to decrease their crop productions and therefore decrease their active
- Throughout the years, this trend has continued as our need for water grows.

- With this project we hope to find how much vegetation has changed by obtaining the square footage of each class of vegetation.
- We also hope to provide a visual representation of that

- Three sets of satellite images, spanning from Fresno county to Kern County, were downloaded from the USGS site. EarthExplorer
- The images were from the dates-
 - 4/23/2012
 - 4/21/2017 5/6/2022
- These images were then reclassified using the Normalized Difference Vegetation Index (NDVI) to show the decrease of vegetation in the area
- If you are interested in learning more about how California's drought has affected farmers and our plants, you can scan this QR code in order to be linked to the document containing all of our sources



NDVI Image - 4/23/12 NDVI Image - 4/21/17 NDVI Image - 5/6/22 Area in each NDVI class, all years, measured in km^2 NDVI Class Plant Health 4/21/2017 5/6/2022 Unhealthy Plant 21.908.206

In our three NDVI images, we can begin to see a decrease in the level of healthy vegetation. There is a decrease of approximately 685 square km, between April of 2012 and May of 2022, of moderately healthy plants. There is an increase in unhealthy plants from April of 2012 to May of 2022 of approximately 2,094 square kilometers. We are not certain about the cause of decreasing dead plants. It is important to remember that the red areas are not just dead plants, but could also be rocky terrain or water. Perhaps the decrease in "dead plants" is actually the decreasing snow levels in

and was entiguinshed on Christmas day, December 25, 2020. During this nearly four month fire there was a total of 379.985 acres spanning across two counties that hurned In addition to the large scorched area the damages included 856 destroyed structures. 26 confirmed fire personnel and civilian injuries, and lastly an estimated total of \$193 million dollars in fire suspension costs. From the 856 structures destroyed. 71 residential & commercial structural damages were lost in the fire. Although the material damage was extensive, there were luckily zero fatalities that resulted for the flames



Creek Fire

Effects Years After

Jacob Velasquez, Fernando Mendoza Navarro.

David Kglyan, Murad Ahmed, Crystal Hernandez

Creek Fire. Some of the images represent True Color. Short Wave Infrared Composite (SWIR) False Color Composite Normalized Difference Vegetation Index (NDVI), or a mixture of some.

In conclusion the aftermath of the Creek Fit

Fresno City College

While we understand that the Creek Fire

housands of acres of land, many do not

that those acres of land belonged and

thousands of animals and critters. The

Nevada mountains are home to a multite

wildlife such as Mule Deer, California

and Spotted Towhee to name a few, but

the fire many of these animals were for

flee their their homes. Which can result in

animals relocating themselves in n

ecosystem, which can then result in

nearby ecosystems equilibriums being

off do to the surplus of wildlife that are s

extensive and devastating, even two years the land itself has not returned to what it was. Hopefully lesson are learned and wi creation of the Creek Fire After-/ Improvement plan incidents like this will be



Scan For Works Cited

Mentoring

Faculty Mentors

- Math and physics faculty
- Scholars choose their mentor
- Mentor training
- Monthly (or more) meetings
- Additional mentoring for students on academic probation

Peer Mentoring

- Academic and psychosocial support
- Students from earlier cohorts mentor new cohorts
- Training is important
- Help with community building and sense of belonging





Scholar Feedback

UG Research

- learning new skills
- understanding the commitment and the level of work that is expected
- opportunities to think about future career paths
- working as a team toward a common goal

Faculty Mentor

- advice with scheduling and work load management
- support when struggling
- being available at all times
- listening and inspiring
- providing consistent support
- caring about student's success
- checking in to make sure students were on track with courses

Peer Mentor

- having someone to relate to and who understands what they are going through
- encouragement to succeed
- opportunities to learn about relatable experiences and receive advice



Scholar Recommendations

Peer mentoring

- Have peer mentors set goals for themselves to identify what they are seeking from being a mentor and support them in ways to address those goals.
- Provide structure for peer mentoring sessions such as providing topics for discussion with their mentees.

UG Research

• Students are interested in undergraduate research projects that are interdisciplinary in nature.

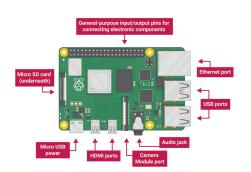


Thank you!

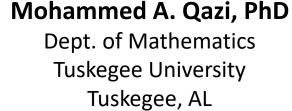
Making to Achieve Knowledge, Excellence and Recognition in STEM (MAKERS)

Funded by the NSF S-STEM Program

Capacity Building at MSIs Webinar Series



April 6, 2023

























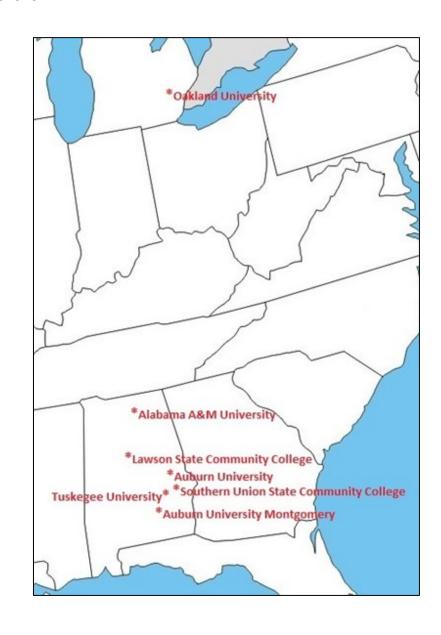
www.stem-makers.net



Acknowledgements: This material is based upon work supported by the National Science Foundation Grants No. HRD – 1644066, 1643799, 1643953 & 1644007

MAKERS Consortium

- A \$5.16 Million Consortium funded by the NSF S-STEM Program (2016-To date)
 - Tuskegee University, AL
 - Auburn University, AL
 - Auburn University Montgomery, AL
 - Alabama A&M University, AL
 - Lawson State Community College, AL
 - Oakland University, MI
 - Southern Union State Community College, AL
- Program recruits FR, SO, JR, SR
 - Low Income, STEM Majors
 - Unique students supported since 2017: 255
 - o Freshmen: 130
- Scholarships of upto \$10,000 for upto 4 years offered based on need



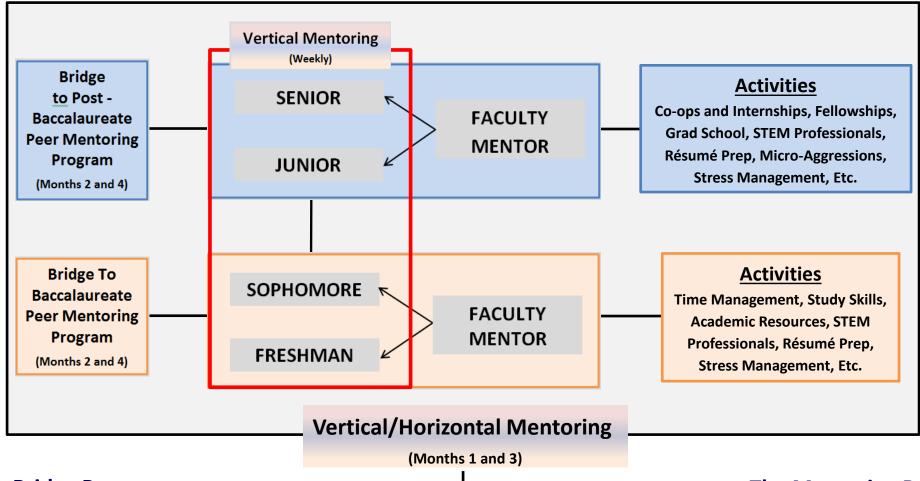
MAKERS Goals

- **Goal 1.** To increase <u>academic skills</u> of low-income, academically talented STEM undergraduate students to promote timely completion of their studies.
 - Co-curricular Mentoring Bridge Program
- <u>Goal 2</u>. To provide Scholars with deep STEM <u>professional</u> <u>skills</u> and cutting-edge STEM experiences, increasing their readiness to enter the STEM/technical workforce and/or Graduate School.
 - Co-curricular STEM-based prototype development to address problems in the community
- <u>Goal 3</u>: To investigate the S-STEM MAKERS model's impact on recruitment, retention, success and graduation of target students from a social science research perspective.





Goal 1: Persistence in the STEM Major – The Mentoring Bridge Program



The Mentoring Bridge Program

• Features:

- Horizontal Mentoring
- Vertical Mentoring
- Student Cohorts
- Mentoring by STEM Faculty

Activities

Program Goals, Expectations, University Resources, Surveys, University Administration Speakers, Accomplished STEM Alumni Speakers, Participation in Conferences Etc.

The Mentoring Bridge Program

- Promotes Student's:
 - Academic Integration
 - Social Integration
 - Community Building
 - Resourcefulness

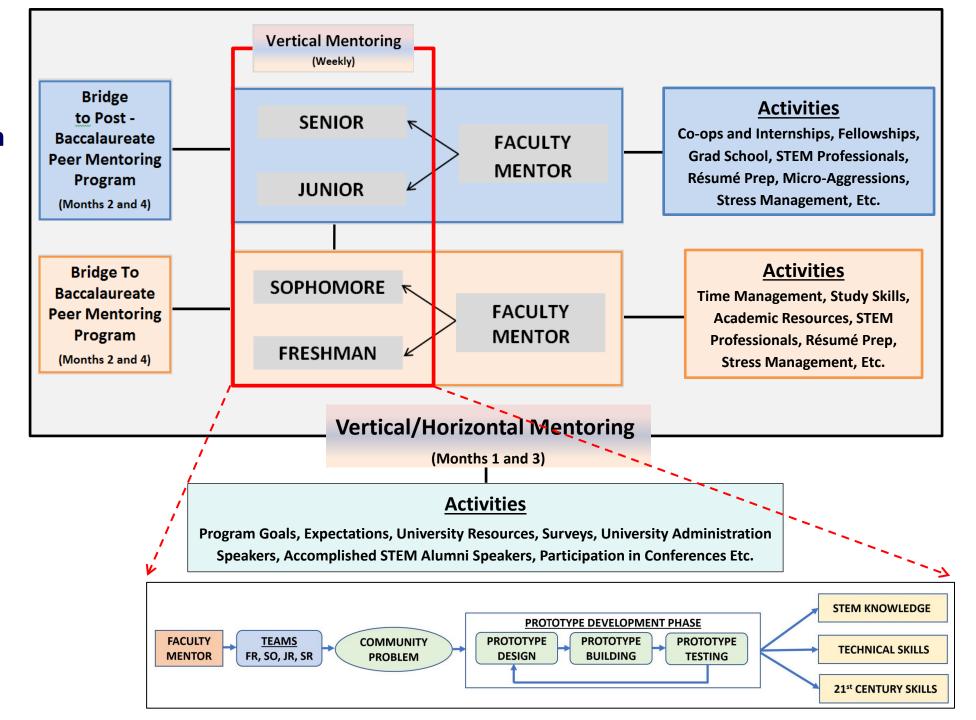
<u>Goal 2</u>: STEM Workforce Preparation – Community-Based Challenges and Prototype Development (MAKERS Intervention)

- Conventional Practice: Internships, Co-ops
 - But not all applicants are awarded positions
- Alternative Approach: Simulates workforce experiences as a *co-curricular* process during the academic year:
 - Community-based problems: Making of a prototype
 - Example: Access to vital resources
 - <u>Example</u>: Accessibility/health issues
 - <u>Example</u>: Improving amenities on College campuses
 - Students discover STEM concepts that must come together to make the product work and gain skills sought by employers (21st Century and technical skills)
 - Build prototype at minimal cost

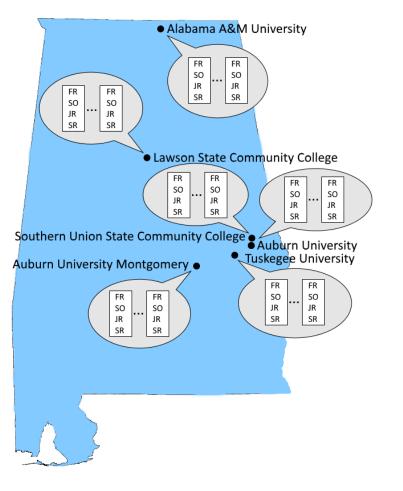




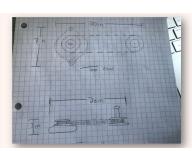
Goal 2: Workforce Preparation



Goal 2: Workforce Preparation - The Making Intervention























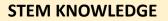








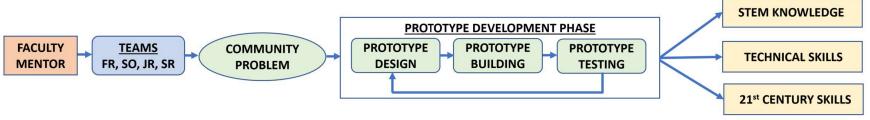




TECHNICAL SKILLS

21st CENTURY SKILLS

Goal 2: Workforce Preparation - The Making Intervention



Examples of Prototypes by MAKERS Scholars:

• Town Community:

- An accessible trash can
- A reusable, portable, filtering shower

• Campus Community:

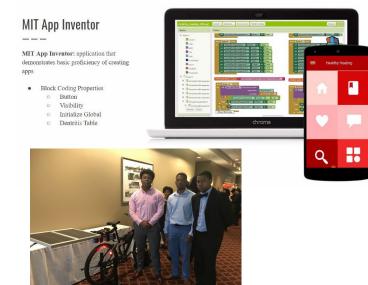
- A mailbox notification system
- A solar powered, air cooled, motion activated light source

Community Health:

- An app to provides nutritional recipes based on illnesses
- A sustainable e-bike for physical and environmental health and fitness awareness















Joint HBCU-UP, LSAMP, S-STEM Conference: Prototype Showcase













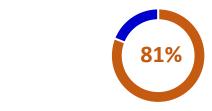
Bridge and Cluster Outcomes

- Grains/improvements in (Mean: High 3.0s Low 4.0s out of 5.0):
 - Social (peer) support networks
 - Time Management
 - Academic and Study Skills
 - Relationship with Faculty
 - Knowledge of Internship Opportunities
 - Knowledge of Graduate School Opportunities
 - Ability to Help (Mentor) Others
 - Commitment to Completing Degree

MAKERS Findings: Workforce Preparation

- Notable increases in (Mean: Low-to-Mid 4.0s on a 5.0 scale)
 - Teamwork skills
 - Problem solving Skills
 - Creativity skills
 - Content knowledge in the field

Students Retained in MAKERS Program



MAKERS Graduates in STEM Workforce / Graduate School

Other Gains:

Opportunities to apply content to address real world issues



- Better preparation for Graduate School and/or a job in the STEM field
- Ability to review research related to the selected project
- Ability to maximize benefits of the prototype while minimizing costs
- The trial and error phase was valuable in developing the prototypes
- Discussion of Patents















CAPACITY BUILDING AT MSI WEBINAR SERIES

The View from Here: Practices and Perspectives addressing STEM inequity in the Pacific Region

Helen Turner, Ph.D.

Professor of Biology & Faculty in Data Science Research Director, UN CIFAL Center, Honolulu

April 2023









HAWAI'I DATA SCIENCE





Kamehameha Schools[,]

Pacific Context



BROADENING PARTICIPATION CHALLENGES and OPPORTUNITIES in Hawai'i-Pacific STEM

CHALLENGES:

- Geography
- Resources
- Inclusion and belonging

OPPORTUNITIES:

- Historical/ contemporary indigenous knowledge
- Move from aid to innovation
- Talent pool

Pacific Context

BROADENING PARTICIPATION IMPERATIVES in Hawai'i-Pacific STEM

- Existential threats (food supply, climate change, nuclear legacy, solid waste)
- Stunning inequities (education, economics, health, criminal justice, incarceration, military service)
- Missed opportunities for global learning from Pacific ways
- Support of the 2050 Strategy for the Blue Pacific Continent

Our students are driven to engage these challenges and to lead, if we solve issues of access, opportunity, belonging and landings











A tale of three programs

Ho`oulu Model for STEM INCLUSION

Mitigate financial barriers to participation in STEM by providing up to 100% tuition and living allowances, decreasing the need to work and commute

Build culture and community-based education into STEM as part of the 'cake not the frosting'

Adapt and adopt best practices in inclusive pedagogy, enculturation of curriculum and contextualize the Hawaiian-Pasifika academic journey through a 'mauka-to-makai' meta-curriculum linked to students' sociocultural Context and social justice priorities

Provide unprecedented levels of wrapround student support through a new 'Academic Navigator' program, where specially-trained Native Hawaiian faculty provide life coaching, academic advocacy, access to professional tutors, cultural programming and spiritual support

Identify, develop and implement new STEM programs in areas of high need and engagement for the Hawai'i-Pacific region: data analytics, environmental science, public health

Wraparound services

Academic Navigators Program

- Weekly check-in surveys (>12000 deployed, 96% response rate, resulting in >4000 interventions)
- Life coaching
- Advocacy
- Professional tutoring for course crises
- >100 cultural workshops
- Annual Retreats
- Social events and community-building
- Food security care packages
- Period security care packages
- Career planning
- Internships
- Professional Certifications

"I have appreciated the love and support our [Academic Navigators] give us, as they have shown me day in and day out how much they care about our success."

"......I have a community to rely on and to talk to when things are going great or not so great. It means that I have an amazing support system to help me wherever I go in the world."

"They were always there when I needed them. When having a hard time in a class, they would seek tutors to assist me. They were always rooting for us and showed it with every action they took."

"Ho'oulu gave me a family at school to struggle and grow with, we got to experience all kinds of different things together and it gave me a purpose to keep going when things were hard"











Ho`oulu Model Programs

Three Programs Use the Ho'oulu Model at Chaminade

Ho'oulu STEM Scholars

2016-27

184 low-income Native Hawaiian students in 9 cohorts all STEM majors 100% tuition award

S-STEM 'Inana

2018-24

20 low-income students, 2 cohorts
'Ōiwi-Pasifika, Veteran, formerly incarcerated, neurodiverse
Biology and Environmental majors
Up to \$10,000 tuition award

S-STEM PEARL

2020-25

22 low-income students , 2 cohorts
'Ōiwi-Pasifika, Veteran, formerly incarcerated
Data Science majors
Up to \$10,000 tuition award



Outcomes: Ho`oulu and S-STEM

Ho'oulu STEM Scholars

- · 95% retention, 89% 4-year graduation rate
- 99 degrees and 35 minors earned by 90 graduates
- 94% first time class pass rate
- Mean GPA current students 3.43
- Mean GPA at graduation 3.55
- 59/90 graduates retained in Hawai'i
- 27/90 graduates in MS, MD or PhD
- 25 peer-reviewed papers with Ho`oulu undergraduate authors to date
- 96 research internships
- · 105 conferences
- 100% participation in 103 service events.

S-STEM 'Inana

- 80% retention rate, 5 graduates to date
- 6 majors and 2 minors earned by 5 graduates
- Mean GPA current students is 3.43
- Mean GPA at graduation is 3.35
- 13 research/internship experiences
- 100% service activity participation



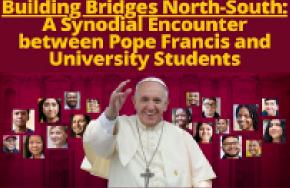
S-STEM PEARL

- 85% retention rate, 2 graduates to date
- 4 majors and 2 minors earned by 2 graduates
- Mean GPA current students is 3.77
- Mean GPA at graduation is 3.62
- 10 research/internship experiences
- 100% service activity participation



In 2022 'Inana
Scholar Alycia
Tausaga and
Ho'oulu Scholar
Joseph Durocher
briefed Pope Francis
on Pacific climate
change







In 2022, Chaminade graduated the first Data Science majors in the history of the State of Hawai'i. Of these 8 graduates 7 are Native Hawaiian, 7 are women, and 6 are Native Hawaiian women. 80% are Ho'oulu and S-STEM Scholars. 100% are placed in Data Analyst jobs in Hawai'i or in graduate school.

Taylor Ishisaka BS DS '22



WINNER

Supercomputing '21 International Data Science Competition Sponsored by



PhD program in Biomedical Data Science, University of Wisconsin

Dairian Balai BS DS '22



Intern, Maternal Health Analytics, TACC
Super Computing 18, 19
INCLUDES Summer Data Science program
Intern, Hawaii Appleseed Justice Project
Advanced Computing for Social Change
Institute

PhD program, Data Science, Purdue

Melia Soque, BS DS '22



Intern, Maternal Health Analytics, TACC
Super Computing 18, 19
INCLUDES Summer Data Science program
Intern, Hawaii Appleseed Justice Project
Advanced Computing for Social Change
Institute

MS in Data Science program, Berkeley

Additional dimensions



Makuahine Meleana 'I am hungry for the work'

Culture

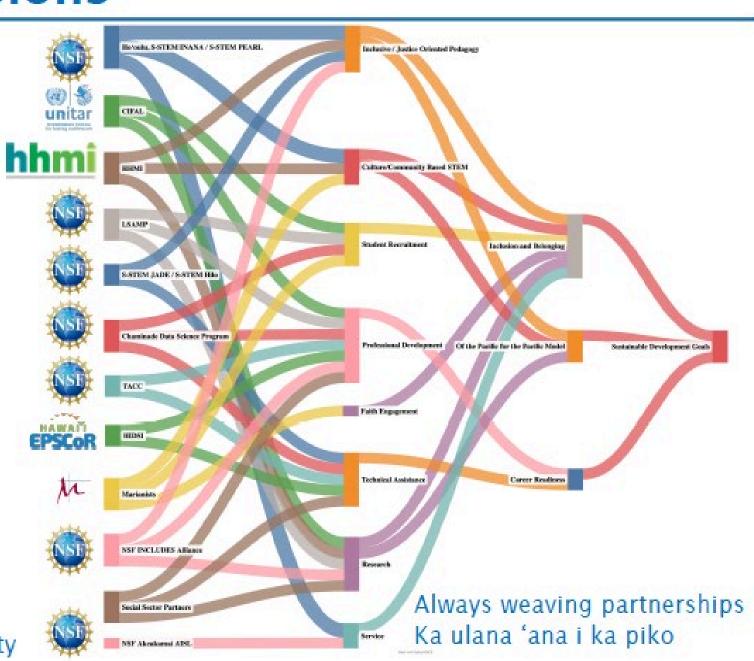
Science

Western

Faith

Pacific

'Between Knowledges'
Comfortable with complexity



Gratitude

Support

Chaminade President and Provost Dean Gail Grabowsky Father Martin Solma, SM Vice Provost Janet Davidson, PhD

Dr. Jolene Haunani Cogbill Dr. Chrystie Kaipolani Nae`ole Kumu Kahoali`i Keahi-Wood Dr. Rylan Chong

Dr. Alex Stokes

Dr. Mary Perez-Hattori

Dr. Kelly Gaither

Dr. JD Baker

Dr. Gwen Jacobs

Lauren Nahme

Chaminade Faculty and Staff Alliance Team S-STEM: Inana DUE-1833772

S-STEM: PEARL DUE-2030654

S-STEM: STRIDE DUE-2221448

I-USE: DUE-1525884

ESPCoR: OIA-1557349

AISL: DRL-1811691

BSCER: DGR-2125483

INDLUDES DDLP: HRD-1744526

INCLUDES ALLIANCE: HRD-2217242

LSAMP: HRD-182684

CyberTraining: OAC-1931575

Next Steps



Language equity Incarcerated students Solution entrepreneurs

Q&A



AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Upcoming Opportunities and Resources

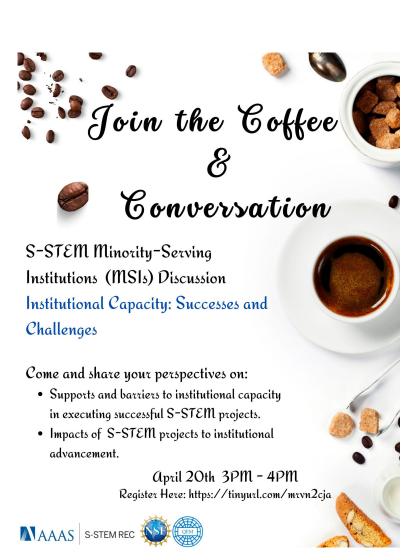
Upcoming Events

- Coffee and Conversation
 - April 20, 3:00-4:00pm EST https://tinyurl.com/mrvn2cja
- S-STEM Annual Scholars Meeting
 - September 14-16, 2023, Washington, DC

Resources

- New S-STEM REC Website!
 - https://sstemrec.aaas.org/

Slides from today's webinar are also posted at: www.sstem.aaas.org/webinar





Thank you!

Connect with the AAAS S-STEM REC!

Explore: https://sstemrec.aaas.org/

Follow Us on Twitter: @sstem program

Connect on LinkedIn: s-stem-program

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