

Cover

Federal Agency and Organization Element to Which Report is Submitted: 4900

Federal Grant or Other Identifying Number Assigned by Agency: 1564587

Project Title: Scholarships For Excellence, Achievement, and Professional Competence in Science, Math, and Engineering

PD/PI Name: Mark Wong, Principal Investigator
Mayra Padilla, Co-Principal Investigator
Seti Sidharta, Co-Principal Investigator

Recipient Organization: Contra Costa Community College District

Project/Grant Period: 08/15/2016 - 07/31/2021

Reporting Period: 08/01/2019 - 07/31/2020

Submitting Official (if other than PD\PI): Mark Wong
Principal Investigator

Submission Date: 07/20/2020

Signature of Submitting Official (signature shall be submitted in accordance with agency specific instructions) Mark Wong

Accomplishments

* What are the major goals of the project?

The Contra Costa College (CCC) S-STEM Scholars project supports the goals of the NSF

S-STEM program:

***Improved educational opportunity for students.** To provide opportunities to greater numbers of low-income and underrepresented students to complete an associate degree in STEM and/or transfer to a baccalaureate STEM program.

***Increased retention of students to degree achievement.** To engage students in new learning strategies through cohort development and learning communities.

***Increased student support programs at institutions of higher education.** To provide an array of support services to ensure the successful progression of students from entry to degree completion and into careers in STEM fields.

***Increased the number of well-educated and skilled employees in technical areas of need.** To provide more STEM graduates from underrepresented groups to meet the burgeoning regional and national need and expand the diversity in the technology workforce.

* What was accomplished under these goals (you must provide information for at least one of the 4 categories below)?

Major Activities: To achieve a student support program at our college, we provided an array of support services to ensure progress and completion by students, from the moment they joined the S-STEM program through degree completion and transferring. Those support services included counseling sessions with STEM Counselors, weekly group meetings and one-on-one meetings with mentors and career coaches from the college's STEM Center. Furthermore, we arranged for STEM based seminars so that students could learn about STEM work and practices done by professionals in various fields.

Specific Objectives:

For specific objectives, we offered individual and personalized assistance geared towards transfer, scholarship, and internship applications, opportunities for academic trips and conferences, hands-on projects on campus, and paid summer research/hands-on experiences.

Significant Results:

Program Statistics and Activities

In FY 2019-2020, we served 29 students in the fall semester and 37 students in the spring semester. The data we present here are based on the Spring 2020 database. Of the 37 students, 43.24% are females and 56.76 are males. On the ethnicity breakdown, 56.76% are Asians including Filipinos and other SouthEast Asians, 43.24% are Latinos/Hispanics, 18.92% are a mix of two ethnic groups or more, and 5.40% are African Americans. Fields of study include Engineering (54.05%), biological sciences (21.62%), physical science (13.51%), and computer science (10.81%).

Seminars

Our program incorporate seminars, workshops, and internships aimed at helping students learn, train, and develop as future scientists.

Fall 2019

We started with a Meet and Greet event where mentors, program staff, continuing students, and potential students met for the first time after their long summer break. Then we had a summer internship panel where six students shared their research experience at institutions including a USDA lab, Oakland Childrens Hospital, Harvard University, University of Michigan, and City of Richmond. They also shared tips on how to search and create competitive applications.

Mid semester in Fall 2019, we had two workshops; on the Avenue E program at University of California Davis and on UC transfer applications. Avenue E is a program designed to help community college transfer students smoothly transition to UC Davis, and ultimately, a career in engineering or computer science. The program was developed by UC Davis and founding corporate partner, Chevron, in collaboration with Los Rios, Peralta, San Joaquin, and Contra Costa Community College districts. This program richly benefit students by offering mentorships, research opportunities, and other academically enhancing activities. The UC application workshop was hosted by UC Berkeley Transfer Center's Community College Liaison staff.

The program also hosted Ms. CaT Bobino, a STEM education promoter from the KQED Public Media, a public radio and TV station. Ms. Bobino shared her educational journey and love for science and how she combined her journalism and science backgrounds to obtain wonderful travel opportunities useful for her videos and podcasts. Ms. Bobino also shared her unique perspective as a young black woman in science and radio.

Spring 2020

We started the semester at the end of January with a Meet and Greet followed by group mentor meetings to discuss the focus of the program in the spring: applying for scholarships and summer internships. Mentors helped students in scholarships and internship searches, assisted students in preparing competitive applications, and wrote many letters of recommendation for their mentees.

We had only one seminar prior to the shelter-in-place response to the COVID-19 pandemic. Our speaker was Mr. Mohammad Sham. He is an alumnus of CCC and a recent UC Berkeley Mechanical Engineering graduate. He shared his educational and transfer experience as well as his project in underwater robotics. He was to spend two weeks of research in Tahiti.

During the shelter-in-place, our mentors and program staff reached out to students throughout the semester via emails and phone calls to check in on how the students were doing and ensure their continued success. We offered advice and resources that would help them overcome the challenges posed by the shelter-in-place restrictions. With the assistance of our colleagues from the HSI program and other programs on campus, we provided textbooks/calculators/computer loans, free access to internet, tutoring, and updates on free food programs.

Program Successes

Our program required students to be enrolled as fulltime students, maintain at least a 3.0 GPA with science and math classes not lower than C, and participate in program activities. Students are strongly encouraged to apply for summer internships and external scholarships. In the Fall 2019 academic term, 45.70% of students maintained 3.50 - 4.00 GPA, 37.10% maintained 3.00 - 3.49 GPA, and the rest (17.10%) close to 3.00 GPA. We considered this to be a success considering that the students who earned around 3.00 GPA were mostly engineering majors, which required students to take very challenging courses. In the Spring 2020 academic term, the percentage of students who earned 3.50-4.00 GPA remained constant at 45.90%. The percentage of those who earned 3.00 - 3.49 GPA decreased to 18.90% and the percentage of students who earned below 3.00 GPA increased sharply to 35.20%.

This decline in GPA can likely be explained by the added difficulties that our students faced during the shelter-in-place. We went into countywide shelter-in-place on March 19 and this continued until well past the end of the semester. Initially, our students found the shelter-in-place very challenging at many levels: uncertainties about the future, sudden and unexpected financial pressures, technology challenges (access to reliable internet, laptops, and apps), housing challenges (crowdedness due to all family members having to stay home), and the feeling of isolation from their educational cohort.

Please see the section below for more success stories.

Key outcomes or Other achievements:

Transfer Success

Twelve students will be transferring in Fall 2020. Seven students (58.30%) will be transferring to California State Universities: mainly to CalPoly of San Luis Obispo and San Jose State University for their strong engineering programs. Five students (41.70%) will be transferring to University of California; mainly to UC Berkeley and UC Davis for their strong programs in engineering and biological sciences. A couple of students decided to delay transferring due to the switch to fully online instruction expected at the 4 year schools during the Covid-19 pandemic.

External Scholarships

Our mentors spent countless hours assisting students in their scholarship and internship applications and writing letters of recommendations for S-STEM scholars. The scholarship sources mentioned here are external scholarships, from our College Foundation and other non-profit organizations. Eleven students received a combination of twenty five scholarship awards for a total award amount of **\$71,550**.

Internships

In the past, we have had a range of 10 - 15 students participating in summer research/hands-on experiences at universities, national labs, teaching hospitals, City of Richmond, and local industries. However, most research internship hosts have canceled their summer programs due to the COVID-19 pandemic.

We managed to locate two summer internship positions offering online research opportunities: one at the Childrens Hospital Oakland Research Institute (CHORI) and

the other at the STEM Center of Contra Costa College. The CHORI program is called "Envision Yourself in Science." This program lets students develop basic understanding in research design, review scientific literature, develop professional relationships with mentors and professionals, understand cyber security and safety, create a research proposal, etc. The internship at the STEM Center involves researching and gathering data on comprehensive academic resources for students in pandemic situation. Both students work for eight weeks, 40 hours/week. We will save the funding allocation for the summer internships for later use.

Degrees and Certifications

Eleven students obtained a combination of thirty-two Associate Degrees and twenty Certifications in the STEM fields.

*** What opportunities for training and professional development has the project provided?**

Conferences

We partnered with the Statewide MESA and HSI Program at CCC to provide opportunities for students to participate in conferences.

Two students participated in the 2019 MESA Student Leadership Conference (SLC) on October 25 and 26, 2019. Both students truly loved their experience in SLC. They met many fellow STEM students and professionals with similar cultural backgrounds, learned to collaborate in problem solving activities, and learned to enhance their overall communication skills. A picture of the two students is included in this report.

One student participated in the 2019 SACNAS conference in Honolulu, Oahu, on October 31 - November 2, 2019. He was immersed in learning about research opportunities and professional development sessions as well as attended multicultural celebrations.

Hands-on projects on campus

In the Fall 2019 semester, engineering students formed groups of three and worked on building robotic hands from Arduino microcontrollers, cardboard, straws, strings, and servo motors.

In the Spring 2020 semester, the engineering students formed three groups working on separate projects prior to the Covid-19 shelter-in-place:

1. First group attempted to build an environmental sensing robot using the ActivityBot 360 from Parallax.
2. Second group chose to build a model rocket with a sensor payload.
3. Third group of students were interested in sound and vibration. They tried to assemble a Ruben's tube and Chladni plate. This was led by Alexis Ortiz and here is the presentation

<https://www.youtube.com/watch?v=t0gr7spGPJQ&feature=youtu.be>

*** How have the results been disseminated to communities of interest?**

Professor Mark Wong and Dr. Seti Sidhara participated in the poster session presenting their S-STEM program's three year findings in the 2019 Symposium NSF S-STEM on September 12-14 at the Hyatt Regency Capitol Hill, Washington, DC.

*** What do you plan to do during the next reporting period to accomplish the goals?**

Due to the social distancing, our College instituted online and hybrid courses. It is our estimate that we have to practice the social distancing until the Spring 2021 term. Thus, we will continue to conduct our program elements via online modes. Our strategies for the Fall 2020 and Spring 2021 are below:

1. We will work with STEM faculty members to recruit applicants from their STEM classes.

2. Complete applications will be disseminated to the mentors and staff and student selection will be decided via face-to-face meetings and/or Zoom discussions.
3. Group mentor meetings. STEM seminars, transfer workshops will be done through the Zoom conferences until the College deems that it is safe to meet face-to face.
4. Academic trips will be done only if it is safe to do so.
5. Dissemination of information on transfer processes, university updates, external scholarships, and 2021 summer internship opportunities will be put on our website and sent via emails.

Supporting Files

Filename	Description	Uploaded By	Uploaded On
Contra Costa College AAAS Poster.pdf	Poster presentation of our S-STEM's three year finding.	Mark Wong	07/09/2020
CSE Comprehensive Summary of Feedback-Spring2020-FINAL.pdf	Contra Costa College S-STEM 2019-2020 evaluation.	Mark Wong	07/09/2020
CCC S-STEM report data for NSF.pdf	Success data and pie charts for 2019-2020 report	Mark Wong	07/13/2020

Products

Books

Nothing to report.

Book Chapters

Nothing to report.

Inventions

Nothing to report.

Journals or Juried Conference Papers

Nothing to report.

Licenses

Nothing to report.

Other Conference Presentations / Papers

Nothing to report.

Other Products

Nothing to report.

Other Publications

Nothing to report.

Patents

Nothing to report.

Technologies or Techniques

Nothing to report.

Thesis/Dissertations

Nothing to report.

Websites

Nothing to report.

Supporting Files

Filename	Description	Uploaded By	Uploaded On
Image 01 (Students at MESA Student Leadership Conference).pdf	Image of students at 2019 MESA Student Leadership.	Mark Wong	07/15/2020
Image 02 (Students Presenting at Our 2019 Summer Internship Panel).pdf	Students presenting about their summer internships at our 2019 Summer Internship Panel.	Mark Wong	07/15/2020
Image 03 (CaT Bobino Seminar).pdf	KQED's CaT Bobino presenting during her seminar at Contra Costa College.	Mark Wong	07/15/2020
Image 04 (Audience From CaT Bobino Seminar).pdf	Audience from Ms. CaT Bobino's seminar at Contra Costa College.	Mark Wong	07/15/2020

Participants/Organizations

What individuals have worked on the project?

Name	Most Senior Project Role	Nearest Person Month Worked
Wong, Mark	PD/PI	2
Padilla, Mayra	Co PD/PI	1
Sidharta, Seti	Co PD/PI	12

Full details of individuals who have worked on the project:

Mark Wong

Email: mwong@contracosta.edu

Most Senior Project Role: PD/PI

Nearest Person Month Worked: 2

Contribution to the Project: Oversees overall grant implementation: assisting in student selection, working on dissemination presentation, cooperatively working with Co PI and mentors in advising program participants, and overseeing budget.

Funding Support: Contra Costa College and S-STEM grant

International Collaboration: No

International Travel: No

Mayra Padilla

Email: mpadilla@contracosta.edu

Most Senior Project Role: Co PD/PI

Nearest Person Month Worked: 1

Contribution to the Project: Assisting Professor Mark Wong and Dr. Seti Sidharta in disseminating program finding at the college level and leverage her HSI STEM budget to provide more resources for S-STEM program participants.

Funding Support: Contra Costa College and HSI STEM funding

International Collaboration: No

International Travel: No

Seti Sidharta

Email: ssidharta@contracosta.edu

Most Senior Project Role: Co PD/PI

Nearest Person Month Worked: 12

Contribution to the Project: Dr. Seti Sidharta recruits and selects students, plans and executes program activities, manages budgets, writes reports, disseminates program information to campus community and partners, ensure program compliance according to federal funding guideline, etc.

Funding Support: Contra Costa College

International Collaboration: No

International Travel: No

What other organizations have been involved as partners?

Name	Type of Partner Organization	Location
Children Hospital Oakland Research Institute	Academic Institution	Oakland
Lawrence Hall of Science	Academic Institution	Berkeley, CA

Full details of organizations that have been involved as partners:

Children Hospital Oakland Research Institute

Organization Type: Academic Institution

Organization Location: Oakland

Partner's Contribution to the Project:

Collaborative Research

More Detail on Partner and Contribution: Children Hospital Research Institute provides facility, mentor, and research opportunities for our S-STEM scholars during the summer.

Lawrence Hall of Science

Organization Type: Academic Institution

Organization Location: Berkeley, CA

Partner's Contribution to the Project:

Other: Project Evaluator

More Detail on Partner and Contribution: Lawrence Hall of Science is our partner for program evaluation. Their personnel observed our activities and conduct surveys and focus group meetings.

What other collaborators or contacts have been involved?

Nothing to report

Impacts

What is the impact on the development of the principal discipline(s) of the project?

Nothing to report.

What is the impact on other disciplines?

Nothing to report.

What is the impact on the development of human resources?

Our key program activities center on the following:

Building an educational process early that leads students to develop academic self-discipline, while emphasizing that math and science research is a social process through

- selecting up 30 students each year and enrolling students in a full-time course of study in science, mathematics, English and engineering
- providing academic advising through counseling office and weekly mentor meetings
- providing academic support activities through workshops and tutoring

Creating access to jobs, internships and cooperative education in science and technology through

- Providing selected students work and research experience showing the real practice of science and engineering.

Communicating how science and technology impacts social and cultural change and enriching and modifying the curriculum to enhance the students experience of science and technology through

- organizing scientifically relevant seminars and discussions twice a month, and
- organizing academic trips to places with science, technology and engineering emphasis, and
- encouraging participation of science faculty in all activities that will increase their knowledge and abilities in how students can learn how to do science

What is the impact on physical resources that form infrastructure?

Nothing to report.

What is the impact on institutional resources that form infrastructure?

Nothing to report.

What is the impact on information resources that form infrastructure?

Nothing to report.

What is the impact on technology transfer?

Nothing to report.

What is the impact on society beyond science and technology?

Students learn many soft skills relating to professional settings when they participate in the summer internship programs. These skills will be highly useful when they start their new career after graduation.

Changes/Problems

Changes in approach and reason for change

Nothing to report.

Actual or Anticipated problems or delays and actions or plans to resolve them

Nothing to report.

Changes that have a significant impact on expenditures

Nothing to report.

Significant changes in use or care of human subjects

Nothing to report.

Significant changes in use or care of vertebrate animals

Nothing to report.

Significant changes in use or care of biohazards

Nothing to report.

Special Requirements

Responses to any special reporting requirements specified in the award terms and conditions, as well as any award specific reporting requirements.

Nothing to report.