



2021-2022 Annual Report



401 Golden Shore Long Beach, CA 90802

Website: www.calstate.edu/stem-net





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Letter From Executive Director



Dear Friends:

The California State University (CSU) system is a resilient one as demonstrated by our ability to persevere even with the pandemic still affecting our everyday lives. It is the people that make up our great institution that have met the challenges head-on and who have shown their ability to both strive and thrive under the most difficult of circumstances. Our students, faculty, and staff have been weathering the storm all the while staying true to the mission of the CSU. Even during these difficulty times, the CSU is still the vehicle to upward mobility, where opportunities for all are central to our mission and lifelong learning is a centerpiece. We pride ourselves in not only examining systemic and longstanding barriers to success for marginalized and underrepresented people but in removing them now and once and for all for our students.

My role as Executive Director of STEM-NET has evolved since arriving in August of 2019. The pandemic has been instrumental in its transformation, my approach to the position, and my own expectations driven by talented faculty, administrators, staff, and students. I never considered my employment by the CSU as a Professor of Chemistry or administrator as a job, but a passion, and today still see my activities in leading STEM-NET in the same vein. Not a day goes by I am not challenged by educational or technical questions of all kinds. A wonderful perk of the position is the ability to meet so many great people in our system.

STEM-NET is that soothing force across the CSU motivating scholars to stretch outside their comfort zones, and providing that consistency when things are good or not so good. STEM-NET is the leader among the multi-campus consortia in collaborating with all 23 campuses of the CSU and in all STEM disciplines. Yet, we are not limited to just STEM activities but also join with faculty from non-STEM fields to develop projects and proposals in areas such as sense of belonging, motivation, resiliency, and servingness. This holistic way to approach problems and find answers to societal questions is a model that fits within our mission and bodes well for our students. Whatever future challenges life throws our way (pandemic or not), STEM-NET is well-positioned to contribute to California's workforce building a stronger and better state for our future.

Frank a. Yomes



MISSION

To enable CSU STEM leaders to share expertise and leverage system-wide opportunities to foster the implementation of global best practices for our students and faculty in pedagogy, learning and research related to STEM fields within the CSU system.

VISION

To make the CSU a world-wide leader in increasing the pipeline, preparation, graduation and employment of outstanding, diverse STEM students.



STRATEGIC OBJECTIVES

- Foster and support research and educational scholarship in STEM throughout the CSU system.
- Promote, foster, and support faculty development to improve STEM teaching and learning across the CSU.
- Develop long-term sustainable funding for STEM-NET.
- Communicate with and engage key stakeholder groups in collaborative strategies supporting the vision.
- Promote and develop collaborative partnerships to increase capacity for K-12 STEM teacher preparation.





STEM-NET FACULTY GRANT PROGRAM

This year, STEM-NET supported faculty research, their pursuit of extramural funding, and professional development through our Faculty Fellows program.

The goal of the Faculty Fellows program is to develop and submit targeted STEM-based proposals of a collaborative (multi-campus) nature with potential for a high investment return and with an aim to increase capacity across the CSU system. 11 faculty were nominated by their respective campus provosts to participate in a year-long program to work collaboratively to develop intercampus proposals.





"To me, the STEM-NET Faculty Fellows program is an opportunity to plan and to build transformative research collaborations both here at Cal State LA and at other CSU campuses. In particular it is an opportunity to expose our Cal State La students to research fields while also preparing them for careers in STEM. I am also very excited to share with and learn from the other faculty fellows at the other CSU campuses."

Dr. Olaseni Sode

Cal State LA, Assistant Professor of Chemistry

STEM-NET FACULTY FELLOWS

FACULTY FELLOWS	CSU CAMPUS	Department
AWARDEES		
Dr. Subodh Bhandari	Cal Poly Pomona	Aerospace Engineering
Dr. Jessica De Silva	Stanislaus State	Mathematics
Dr. Zhaoshuo Jiang	San Francisco State	Civil Engineering
Dr. Joseph Kalman	Cal State Long Beach	Mechanical/ Aerospace
Dr. Kamila Larripa	Humboldt State University	Mathematics
Dr. Matthew Leineweber	San Jose State	Biomedical Engineering
Dr. Benjamin Lutz	Cal Poly San Luis Obispo	Mechanical Engineering
Dr. Laura Newcomb	Cal State San Bernardino	Biology
Dr. Omayra Ortega	Sonoma State	Mathematics
Dr. Monica So	Chico State	Chemistry/ Biochemistry
Dr. Olaseni Sode	Cal State LA	Chemistry



ACTIVITIES

STEM-NET webcasts highlight faculty research and foster research collaborations leading to potential funding. A variety of topics demonstrate the high level of research and scholarship conducted in the CSU.

CSU NSF REU and IRES Programs and Awardees (September 17, 2021)

Melissa Olson, Herman Sintim, & Sally E. Connor, NSF, The National Science Foundation Research Experience for Undergraduates Site Program

Mehran Mazari, Cal State LA, Collaborative REU Proposals: Challenge and Opportunities

Betsy Read, CSU San Marcos, Reflections on CSUSM's REU Site: NGS from Beetles to Beer

Zair Ibragimov, Cal State Fullerton, Engaging Students in Research Internationally

Paul Laria, Cal State Long Beach, In it for the Long Run: Developing an REU-Site with a Private Landowner

Corey Garza, CSU Monterey Bay, Monterey Bay Regional Ocean Science REU





STEM-NET WEBCASTS

NIH-Funded CSU Institutional Training Grants and Research Education Programs (October 1 2021)

Lauire Stepanek, National Institutes of Health (NIH), Overview of NIH/NIGMS Programs to Enhance Diversity of the Biomedical Research Workforce

Megumi Fuse, San Francisco State, Student Enrichment Opportunities in STEM at San Francisco State University

Keith A. Trujillo, CSU San Marcos, U-RISE at CSU San Marcos

Judy Brusslan, Cal State Long Beach, The Bridge to the Doctorate Program at CSULB: Listen to the Reviewers and be Creative

Sonsoles de Lacalle, CSU Channel Islands, Initiatives to Enhance Diversity in the Biomedical Research Workforce at CSUCI

Robert L. Vellanoweth, Cal State LA, Key Features of the 25-year Bridge to the Doctorate Program at Cal State LA

NSF RAPID and Eager CSU Grantees (November 4, 2021)

Blake Gillespie, California State University, Channel Islands, Reimagined Virtual STEM Laboratory Experiences in Response to COVID-19

Cueponcaxochitl Moreno Sandoval, California State University, Stanislaus, We are the Earth: Ancestral Computing for Sustainability

Sandrine Matiasek & Jackson Webster, California State University, Chico, Water Quality Impacts of Wildland Urban Interface Burning

Hope A. Johnson, California State University, Fullerton, Manganese Phototrophy in Bacteria - from a Sabbatical to an EAGER

Andrew Danowitz, California Polytechnic State University, San Luis Obispo, NSF Rapid Project: Engineering Student Mental Wellness During the COVID-19 Pandemic

Amy Dao, California State Polytechnic University, Pomona, How Do Multigenerational Households Navigate Care and Safety during the COVID-19 Pandemic?



Help prevent the spread of respiratory diseases like COVID-19.









How Do Multigenerational Households
Navigate Care and Safety during the COVID19 Pandemic?













NSF Geo Directorate Programs and CSU Awardees (December 3, 2021)

Jennifer Wenner and Laura Lautz, National Science Foundation, Navigating NSF

Valbone Memeti, Cal State Fullerton, The Temporal and Spatial Behavior of Magma Plumbing Systems as Seen through the Geochemical and Geochronologic Lens of Minerals

Rachel Teasdale, Chico State, Discipline-Based Education Research in Geology: How are Student Learning and Interest Influenced by TA beliefs in Introductory Courses?

Nathan Onderdonk, Cal State Long Beach, Doing Active Tectonics Research in Southern California, and Strategies for Funding Local Field Work

Kathryn Metcalf, Cal State Fullerton, What Happened During the First Half of the India-Asia Collision?

Amelia Vankeuren, Sacramento State, Combating Climate change with Mantle Rocks & Developing a Cross –CSU





Faculty Representation Matters – CSU BUILD Alliance's Efforts to Mirror Our Students for Health Equity (February 4, 2022)

Kirsten Bibbins-Domingo, UCSF, Faculty Representation for Sustainable Transformation of Science & Health

Leticia Márquez-Magaña, San Francisco State, Assessing Co-Hire Policies for Equitable Faculty Representation

Laura Henriques & Arturo Zavala, Cal State Long Beach, CSU Pre-Professor Program: Strengthening the Faculty Pipeline

Patty Kwan & Jose Vargas, CSUN, "Critical" Mass: Mentorship and Initiatives to Promote

Social Justice Research





Making in the CSU: Makerspaces, Fab Labs, and Innovation Centers (March 4, 2022)

Sinem Siyahhan, CSU San Marcos, Building a Sustainable Maker Ecology by Connecting Undergraduate Students with Children in Afterschool Programs

Lynn Cominsky, Sonoma State, Dream, Make and Innovate: A Service-Learning Class

Chris Bachman, Cal State LA, Creating a Makerspace at Cal State LA

Andrea Medina & Bobby Hartsock, CSU Bakersfield, California State University, Bakersfield Fab Lab Best Practices

Erin Cole, Cal Maritime, Making a Makerspace: Finding & Fostering a Creative Campus Community

Mike DeMars, Cal State Fullerton, Making it Work: Building a Makerspace During a Pandemic







NSF Robert Noyce Teacher Scholarship Program and CSU Grantees (April 8, 2022)

Michael Ferrara, National Science Foundation, An Overview of the NSF Noyce Teacher Scholarship Program

Fred Uy, CSU Chancellor's office, Dream, The Partnership of MSTI and Noyce Programs Through the Years

Kimberly Seashore, San Francisco State, Transforming community through STEM Education - SFSU Noyce STAJES: STEM Teaching Toward a Just and Equitable Society

Stamatis Vokos, Cal Poly SLO, Expanding the Reach of a Successful Pre-service Teacher Research Program

Kathy Hann & Michele Korb, CSU Eastbay, Supporting Excellence, Effectiveness and Diversity in STEM Education

Mark Ellis, Cal State Fullerton, Advancing Teachers of Mathematics to Advance Learning for All: A Four-Year Journey of Growth and Transformation United Nation's Sustainable Development Goals (SDGs) (April 21, 2022)

Ganesh Raman, Chancellor's Office, Welcome, Introduction and Framing of SDG Elements and Data

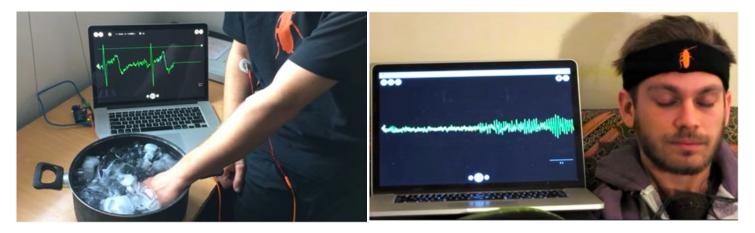
Debbie Andres and William
DeVincenzi, San Jose State, Complete
SDG Assessment for San Jose State
University

Jun Bando, CCST, United Nation's Sustainable Development Goals: Trends and Opportunities

Emma V. Sanchez, SFSU, Nutrition and Health Equity: The Role of Policies and Built Environments

Arne Jacobson, Cal Poly Humboldt, Creating Institutions to Support SGD Progress: Quality Assurance for Off Grid Solar Products





NSF EHR Core Research (ECR) Program and CSU Grantees (May 20, 2022)

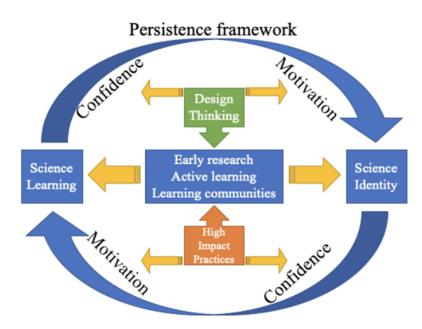
Earnestine Easter, National Science Foundation, NSF EHR Core Research (ECR) Program

Philip Vieira, Cal State Dominguez Hills, Supporting Student Success through a Combination of High Impact Educational Practices and Asset-Based Training

Dustin Thoman, San Diego State University, Diversity Interventions in the Classroom: From Resistance to Action

Melo-Jean Yap, San Diego State University, Influential Networks for Women of Color in STEM Community College Pathways

P. Wesley Schultz, Cal State San Marcos, Becoming a Scientist: Identity Balance Among Underrepresented Students in STEM







STEM Program Assessment and Evaluation (June 29, 2022)

Heather Macias & Rachel Part, CSULB & Meta, The Golden Ticket: When, Why, and How to use a Mixed Methods Evaluation Plan

Dalton Marsh, CSUSB, Assessing Self-Perceptions and Habits of Mind in STEM

Jane Lehr, Cal Poly SLO, Utilizing and Evaluating Network Improvement Communities (NIC) in CS4All Initiatives

Nada Rayyes, CSULB, Supporting Undergraduate Research: Evaluating the CSULB BUILD Program

Fadi Castronovo, Castronovo LLC, Assessing Beyond knowledge and skills. Measuring and Evaluating Self-Efficacy, Engagement, Identity, and Sense of Belonging in Summer Research Programs.



VIRTUAL RESEARCH CAFÉ 10.0

The Café brings together CSU assistant professors to help foster research collaborations across the CSU system and catalyze the submission of intercampus proposals. Each café involves three Assistant Professor's research and ideas (10 minutes) for future work. Q&A takes place during the virtual mixer following the presentations.

Café (September 17, 2021)



Dr. Santosh KCAssistant Professor
Department of Chemical and Materials
San Jose State



Presentation Topic: Surface and Interface Properties of 2D Materials

Dr. Liz KyonkaAssistant Professor
Department of Psychology
Cal State East Bay

Presentation Topic: Functional Assessment of Technology Use



Dr. Wing To
Assistant Professor
Department of Physics
Stanislaus State

Presentation Topic: Adaptive Interdisciplinary Research into Atmospheric Effects of California Wildfires



Café (October 15, 2021)



Dr. Jorjeta Jetcheva
Assistant Professor
Department of Computer Engineering
San José State
Presentation Title: Personal Knowledge Assistants



Assistant Professor
Department of Earth Science & Geography
CSU Dominguez Hills
Presentation Title: Promoting Healthy Communities through
Transportation and Environment



Dr. Breanna Putman
Assistant Professor
Department of Biology
Cal State San Bernardino
Presentation Title: The New Normal: What makes animals prepared to survive wildfires?

Café (November 19, 2021)



Dr. Kristi Closser

Assistant Professor

Department of Chemistry and Biochemistry

Fresno State

Department of Title I Live Operators Classiciants State Discontinuous Constitution Constit

Population Dynamics

Presentation Title: Using Quantum Chemistry to Study Photodegradation of Persistent Organic Pollutants



Dr. Raisa Hernandez Pacheco
Assistant Professor
Department of Biological Sciences
Cal State Long Beach
Presentation Title: Rhesus Macaques as Models of Life History Theory and



Dr. Louise EdwardsAssistant Professor
Department of Physics
Cal Poly San Luis Obispo

Presentation Title: Hidden Worlds at Dawn and Dusk: Mitigating the

effects of Satellite Megaconstellations

Café (February 16, 2022)



Dr. Carlos Rojas
Assistant Professor
Department of Computer Engineering
San Jose State University
Presentation Topic: Analyzing 3D Genomic Structures



Dr. Virginia Isava
Assistant Professor
Department of Geology Education
Cal State Fullerton
Presentation Topic: Helping Geoscience Undergraduates Think like
Experts



Dr. Jamie Booth
Assistant Professor
Department of Mechanical Engineering
CSUN
Presentation Topic: Bioinspired Solutions to Resist Facture in Engineering
Materials and Interfaces

Café (March 16, 2022)



Dr. Nadia Korovina
Assistant Professor
Department of Chemistry and Biochemistry
Chico State
Presentation Topic: Epistemologies of Mathematics





Dr. Brian Katz
Assistant Professor
Department of Math & Statistics
Cal State Long Beach
Presentation Topic: Epistemologies of Mathematics



Dr. Alexandra ChakarovAssistant Professor
Department of Computer Science & Science Education
San Jose State

Presentation Topic: Creating Relevant, Interdisciplinary Computer Science Curriculum

Café (April 13, 2022)



Dr. Ava HedayatipourAssistant Professor
Department of Electrical Engineering
Cal State Long Beach **Presentation Topic:** Wearables of Tomorrow

Dr. Jason BurkeAssistant Professor



Department of Chemistry and Biochemistry
Cal State San Bernardino
Presentation Topic: Understanding the Biochemistry of How CancerAssociated Mutations Work in Cancer



Dr. Jaclyn Baughman
Assistant Professor
Department of Geology
Cal Poly Humboldt
Presentation Topic: Creating Equitable, Accessible, and Impactful
Geoscience Field Experiences Using Virtual Reality



Café (May 18, 2022)



Dr. Samantha Leigh
Assistant Professor
Department of Biology
Cal State Dominguez Hills
Presentation Topic: You are what You Eat: Nutritional Physiology in a
Changing Marine Environment



Dr. Joyce Pham
Assistant Professor
Department of Chemistry and Biochemistry
Cal State San Bernardino
Presentation Topic: Extended Solids: Experiment & Computation in Synergy



Dr. Long Wang
Assistant Professor
Department of Civil & Environmental Engineering
Cal Poly San Luis Obispo
Presentation Topic: Sensing Nanocomposites for Structures and Human

Café (June 15, 2022)



Dr. Jeyoung Woo
Assistant Professor
Department of Civil Engineering
Cal Poly Pomona
Presentation Topic: Do It Right the First Time – Transfer Pathway
Program & Quality Management Practice

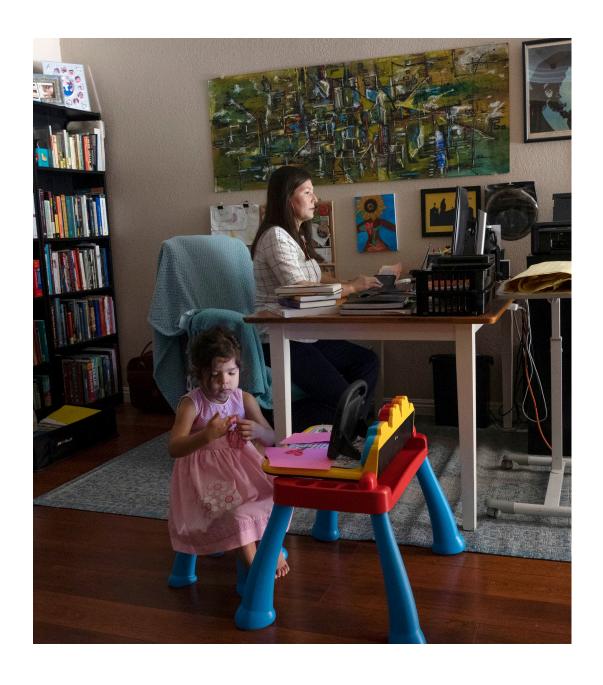


Dr. Divya Sitaraman
Assistant Professor
Department of Psychology
Cal State East Bay
Presentation Topic: Sleep, Unpredictability and Behavioral Choice: You Are

Not the Only One with Problems



Dr. Gerald Cobian
Assistant Professor
Department of Biological Sciences
Chico State
Presentation Topic: Foliar Fungal Endophytes as Early Colonizers of Leaf
Decay Communities







A Centralized hub (Think Tank) for Dissemination of Best Practices for CSU-funded USDE HSI STEM and Articulation Program Projects



In collaboration with Cal Poly Pomona, Cal State Fullerton, CSU Stanislaus, CSU San Marcos, CSU San Bernardino CSU Sacramento, and CSU Bakersfield, STEM-NET obtained funding (\$35,000,000; \$525,000 to STEM-NET) from the United States Department of Education. (ED). This is a collaborative effort to develop a centralized hub for dissemination of best practices and broker ideas, stimulate debate, and offer creative yet practical solutions to tackle the most pressing problems in STEM education.

Collaborative Research: AI Education for Social Good (AI4SG): Broadening AI Education Among Undergraduate Students



In collaboration with San Jose State, CSU Long Beach, Cal Poly Pomona, and CSU San Bernardino, STEM-NET obtained funding (\$599,165; \$96,812 to STEM-NET) from the National Science Foundation. This project aims to develop, implement, and generate evidence-based practices for interdisciplinary, community-engaged, and inclusive artificial intelligence (AI) education among undergraduate students by using AI for social good (AI4SG).



Project Description: Establishing a CSU Community of Expert Rubin Observatory Users



In collaboration with Cal Poly San Luis Obispo, Cal Poly Pomona, CSU Stanislaus, San Diego State, and the Vera C. Rubin Observatory, STEM-NET obtained funding (\$987,834; \$52,953 to STEM-NET) from the National Science Foundation. This project will establish a pathway for undergraduate students and faculty to become expert users of the Rubin Science Platform (RSP) and engage in science prior to the observatory's first public data release in 2024.

CREST Center for Advancement toward Sustainable Urban Systems

In collaboration with Cal State LA, STEM-NET obtained funding (\$5,000,000; \$116,927 to STEM -NET) from the National Science Foundation. This project will create a hub for urban sustainability that will advance energy and water research, and expand opportunities for students to engage in intensive STEM education and training.







STEM-NET SoCalGas Student Research Fellowship

SoCalGas funded (\$10,000) STEM-NET to support three undergraduate students as part of the SoCalGas Student Research Fellowship program. These students worked collaboratively with a CSU STEM faculty member on a research project during the summer 2022 term and participated in Virtual Research event to showcase their research findings.



Student Name: Cody NicholsCampus: Cal State Dominguez Hills

College Level: Junior

Major: Physics

Research Title: Optimizing the Therapeutic using High-

Resolution Optical Tweezer Laser Scanning Confocal Microscopy

(LSCM)



Student Name: Connor Bartholomew

Campus: Cal State Fullerton

College Level: Senior

Major: Computer Engineering

Research Title: Wildfire Detection Project



Student Name: Justin Thomas Self

Campus: Cal Poly College Level: Junior

Major: Aerospace Engineering, Concentration in Astronautics Research Title: Virtual Aperture Multispectral Imaging for Atmospheric Reentry Studies Using High-Altitude Reflective

Atmospheric Reentry Studies Using High-Altitude Reflective

Arrays



All Things STEM Podcast

On this show we will explore all things STEM. Most importantly we will highlight the incredible work of our CSU STEM faculty, students, staff,



administrators and programs. Listen to our podcast here: www.calstate.edu/all-things-stem-podcast or wherever you may listen to your podcast.

Episodes

September 2021

One on One with a CSUN STEM Graduate
Justice Mena, CSUN Alumni, Department of Chemistry

October 2021

Utilizing Citizen Science as a Lens for Research Projects
Dr. Brittney Beck, Assistant Professor, Teacher Education, Director of the Citizen Scientist
Project & Dr. Antje Lauer, Professor, Biology, Cal State Bakersfield

December 2021

Cybersecurity at Cal State San Bernardino

Dr. Tony Coulon, Professor, Information and Decision Sa

Dr. Tony Coulson, Professor, Information and Decision Science, Cal State San Bernadino

March 2022

Sometimes it All Adds Up: Math Professor's Journey from the Barrios of Los Angeles to the White House

Dr. Richard A. Tapia, University Professor, Computational & Applied Mathematics, Rice University

April 2022

Discovering the Mysteries of the Universe and Paving the Way for Black Women in Astronomy and Physics

Dr. Louise Edwards, Assistant Professor, Physics, Cal Poly San Luis Obispo





Episodes

May 2022

The Power of Mentorship

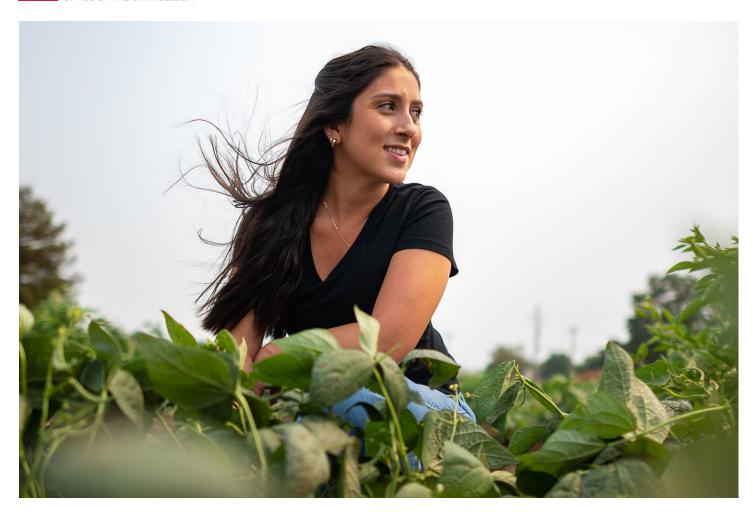
Dr. Keith Trujillo, Professor, Psychology, Cal State San Marcos

June 2022

Teacher of Color Issues, and the Development of Culturally and linguistically Diverse Learners in STEM settings

Dr. Tina Cheuk, Assistant Professor, Elementary Science Education, Cal Poly San Luis Obispo





During the past year, STEM-NET has:

- Facilitated the development and submission of over seven multi-campus proposals.
- Continued to obtain funding from federal and private sources to ensure the future sustainability of STEM-NET.
- Facilitated collaborative STEM-based research and education programs and initiatives across the CSU system and with external partners.
- Developed and produced 10 webcasts covering topics as diverse as STEM program assessment and evaluation, the CSU BUILD programs, and the NSF RAPID and EAGER grantees.
- Developed and produced seven podcasts highlighting the research and scholarship of CSU faculty and students.
- Promoted STEM educational and research achievements of faculty and students of all
- 23 CSU campuses.
- Effectively managed and budgeted for all STEM-NET activities.





FINANCIALS

In academic year 2021-22 STEM-NET made significant investments in faculty and student research to enhance CSU STEM education and research.

This year STEM-NET:

- Provided \$83.023 directly to CSU faculty members and students.
- STEM-NET awarded funds to 11 faculty members at 11 CSU campuses. It also awarded funds to 3 undergraduate CSU students from 3 different campuses.

Budget Allocation

\$ 373,014.00
\$ 122,511.00
\$ 239,286.00
\$ 180,665.00
\$ 396,023.00
\$ 16,210.41
\$ 1,327,709.41

Budget Operating Expenditures

Salaries, Wages, Benefits	\$ 377,054.42
Supplies and Services	\$ 55,360.93
Faculty Grants Dispersed	\$ 75,526.00
Federally Funded Grants and Contracts	\$ 142,205.06
Foundation Gifts and Grants	\$ 8,278.35
Sub-total Operating Expenditures	\$ 658,424.76





VISION OF SUCCESS

Increase external funding & broaden funding streams for STEM-NET to sustain programs & operations.

Increase the development of collaborative proposals with faculty and catalyze multi-campus initiatives.

Further disseminate research and educational best practices of the CSU.

Further develop webcast and podcast program content exploring a broader array of topics.

Pilot new and diverse programs involving different segments of the CSU.

Build more STEM communities of excellence across disciplines and the CSU.





STEM-NET GOVERNING BOARD

PRESIDENTIAL CONSORTIUM



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Cal Poly San Luis Obispo



Dr. Adela de la Torre President San Diego State



Dr. Ellen JunnPresident
Stanislaus State



Dr. Lynn MahoneyPresident
San Francisco State

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Cal Poly Pomona



Dr. Emily AllenDean, Engineering
Cal State LA



Dr. Michael Kaufman Dean, College of Science San José State

