

**STEM-NET Conference:
Becoming More Than the Sum of our Parts
March 16th & 17th
Photo Gallery**

Welcome Session



Keynote Speakers

Jolene Koester, Chancellor

Frank A. Gomez, Executive Director, STEM-NET



Keynote Speaker

Jeffrey Armstrong, President, Cal
Poly San Luis Obispo



Keynote Speaker

Serving Students with Intention

Beatriz Ceja-Williams, Senior
Director, Institutional Higher
Education Programs

Office of Postsecondary Education,
U.S. Department of Education



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Keynote Speaker

Flipping the Table: The Rules of Engagement Have Changed

Teniel Jones, Chief Executive Officer, Base11



Jeffrey D. Armstrong, President,
Cal Poly San Luis Obispo

Soraya M. Coley, President,
Cal Poly Pomona





Left to right

President Jeffrey D. Armstrong, Provost Carl Kemnitz, Dean Alison Baski, Dean Michael Kaufman, Dr. Ganesh Raman

Welcome Session



Welcome Session



Conference Breakout Sessions

Data for Improving Outcomes

Erik Wasinger, Chico State
Heidi Riggio, Cal State LA

CREATE Award Winners

Helen Trejo, Cal Poly Pomona
Dustin Thoman, San Diego State
Cassandra Paul, San Jose State

Inclusive and Culturally Responsive Teaching

Heather Macias, Cal State Long Beach

Connecting University STEM Programs for Student Success

Carmen Domingo, San Francisco State

Undergraduate Research and the Teacher-Scholar Model. Where do we go from here?

Keith Trujillo, CSU San Marcos

What does Experiential Learning Mean to Me? Envisioning the Future

Wei Wu, Fresno State
Vivien Luo, Fresno State

Cultivating Belonging in STEM through Affirming Activities

Audrey Gavino Parangan-Smith, San Francisco State







Breakout Session- Data for Improving Outcomes
Facilitator- Dr. Heidi Riggio, Cal State LA



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Breakout Session- CREATE Award Winners
Facilitator- Helen Trejo, Cal Poly Pomona

Other Facilitators not in the Picture- **Dustin Thoman**, San Diego State
Cassandra Paul, San Jose State



Breakout Session- Inclusive and Culturally Responsive Teaching
Facilitator- Dr. Heather Macias, Cal State Long Beach



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Conference STEM-NET Faculty Fellow Panel

Panelist

Subodh Bhandari, Cal Poly Pomona

Jessica De Silva, Stanislaus State

Olaseni Sode, Cal State LA





Dr. Olaseni Sode, Dr. Omayra Ortega, Dr. Monica So, Dr. Jessica De Silva, Dr. Subodh Bhandari



Alison Baski, Dean of College of Science, Cal Poly Pomona

STEM-NET Faculty Fellows Panel Moderator







Dr. Subodh Bhandari, Dr. Monica So, Dr. Jessica De Silva, Dr. Olaseni Sode
STEM-NET Faculty Fellows

Conference Network Session

Topics:

- NSF Projects/Proposals Brainstorming
- Department of Education Projects/Proposals Brainstorming
- NIH Projects/Proposals Brainstorming
- HSI-STEM Projects/Proposals Brainstorming
- NASA Projects/Proposal Brainstorming
- Other Projects/Proposals Brainstorming
- Recruitment and Retention of a Diverse Student Body
- Diversity, Equity, and Inclusion
- Diversifying the Professoriate
- Addressing Intersectionality

- Barriers to Student Success
- STEM Pedagogy Activities
- Culturally Responsive Teaching and Pedagogy
- Gateway Courses
- Belongingness
- Keeping the Curriculum Relevant: Integrating Emerging Technologies

































Conference Poster Board Session

Poster Board Topics

- Science in Our Community
- Building a Strong Foundation for Success: A Look at STEM Research and Education at Cal State LA
- Advancing STEM Priorities Through Inter-Disciplinary and Inter-Institutional Partnerships
- STEM Scholars @ CSUSM
- Embracing diversity in the Dolphin Pod: Increasing representation in CSUCI STEM majors
- Equitable Assessment at CSUEB
- Maximizing Engineering Potential & Women in Science and Engineering: Inspiring and Supporting the Next Generation of STEM Scholars
- Leveraging a Faculty Community of Practice Model of Professional Learning to Enhance Diversity, Equity, & Inclusion in STEM Teaching, Learning, and Leadership
- Highlighting Undergraduate Research at Cal Poly – a High Impact Practice to Promote Student Success
- Escaping the environmental crises: Online escape rooms for evaluating student lab data analyses skills





California State University, Long Beach Advancing STEM Priorities Through Inter-disciplinary and Inter-institutional Partnerships

S-STEM
As CSU Long Beach advances its Beach 2030 goals of Engaging all students, Expanding access, Promoting intellectual achievement, Building community, and Cultivating resilience, we rely on our foundation of strong internal, public, private, government, and nonprofit partnerships to advance our mission. The examples present here include:

Addressing the underrepresentation of communities from low socioeconomic backgrounds in the physical sciences, mathematics and computer science, existing NSF S-STEM programs are expanding beyond the College of Natural Sciences and Mathematics to join with the Computer Science and Computer Engineering program in the College of engineering.

OURS
Bringing research opportunities to all through multiple individual grants led to the creation of the Office of Undergraduate Research Services (OURS). In collaboration with our NIH-funded BUILD program, OURS has developed a research certificate program to encourage and support participation in research activity.

AIM
As part of broader institutional equity efforts, the BUILD program developed an Advancing Inclusive Mentoring (AIM) program that goes beyond CSULB to the broader CSU, the nation, and the globe for faculty to share best practices.

FACULTY RESEARCH IN CECS
Development of a program to address Computer Science CECS through the National Science Foundation (NSF) grant.

More about S-STEM Program
The Computer Science and Computer Engineering (CECS) program advances equity and participation of under-represented populations through analysis of sources of inequity and mitigating activities in partnership with Loyola Marymount University, UC San Diego and UC Riverside, funded through NSF and the CECS.

Authors: Paul Buonora, Jelena Trajkovic, Amr Morsy, Chi-Ah Chun, Kelly Young, Panadda Marayong, Jen-Mei Chang, Gino Galvez

Summer Scholars @ CSUSM

294 alumni

Summer Scholars 10-week mentored research experience across all STEM disciplines

"... I gained so much from it in the form of personal connections and tips on my career journey. After finishing the apprenticeship, I feel like my future goals are more attainable..."

Summer Scholars Program
10-week Research Experience with Hands-on Research and Career Development

- Students work with a faculty member on an independent project for 20 or 40 hours/week
- Kickoff event at ThermoFisher Scientific in Carlsbad with Alumni panel
- All students meet once a week for career development training/networking
- \$7500/student includes food stipend/parking/lab supplies
- Paired with Grad mentors
- Professional development events
 - NSPBE
 - Career panel
 - Research and Scientific communication training/support
 - Field trips
 - Poster showcase
 - open to campus and local community

Key Features
Local program allowing our regional students to participate in this HP
Students become competitive for other research opportunities
Community and networking with on and off campus partners

Student Participants

- 54% female
- 50% transfer
- 30% first-generation

Program Level Outcomes
100% of program alumni have either graduated in STEM discipline or are continuing students

20% of Summer Scholars are co-authors on scientific publications (58 students)

STEM Summer Scholars alumni continuing to postgraduate education are representative of the racial/ethnic diversity of alumni

- 35% identify as Hispanic
- 30% identify as White
- 10.2% identify as Black or African American
- 11.2% identify broadly as Asian
- 7.4% identify as Filipino
- 4.6% identify as American Indian, and
- 1% identify as Middle Eastern.

Student Level Outcomes
Alumni reported high gains (>4) in thinking and working like a scientist and scientific skills on a 5-point Likert scale

Personal Gains Related to Research

- Understanding what everyday research is like
- Confidence in working collaboratively with others
- Confidence in discussing scientific concepts
- Confidence in doing research

"I discovered that I am more capable of conducting research than I ever thought possible."

Administration and funding model
Multiple grant awards including REU
Corporate sponsorships (e.g., Hologic, Genentech, Viostat)
Three faculty: Julie Jameson, Betsy Read, Hamed Nademi

Future Direction
Collaborate or partner on this model of summer research across CSU campuses

CSUDH Leveraging a Faculty Community of Practice Model of Professional Learning, and Leadership

- Kim Costino, Dean of Undergraduate Studies, California State University, Dominguez Hills
Supported by NSF Award #1928740

Project Goals
Enhance the quality of undergraduate STEM education and increase the retention and graduation rates of students pursuing STEM degrees at CSU Dominguez Hills (CSUDH) and local community colleges.

Research-based assumptions about what contributes to the retention of students of color and female students in STEM

- A. High quality faculty-student interactions
- B. Presence and engagement of faculty who reflect and represent students' identities and experiences
- C. Curriculum, pedagogy, and assessment practices that are rooted in the science of learning, particularly in an understanding of the ways in which learning is impacted by culture, identity, bias, and institutionalized forms of oppression.
- D. The consistent implementation of the above requires a commitment to institutional learning, culture change, and a leadership that engages in and supports such learning and change.

Project Objectives
Based on these assumptions, the objectives of this project are to:

- A. Increase faculty participants' knowledge about how learning works, particularly as it relates to social and cultural factors such as identity, power structures, implicit bias, and institutionalized systems of oppression;
- B. Increase faculty participants' ability to use this knowledge to shape their curriculum, teaching and assessment practices, interactions with students;
- C. Increase faculty participants' ability to use this knowledge to shape their hiring, mentoring, and evaluation practices; and
- D. Build the capacity and sustainability for offering faculty professional development that consistently embeds attention to the role context, culture, identity, and power plays in learning and that is responsive to our student population, student learning and assessment data, faculty needs and interest, and the institute's evolving context.

Formative Findings to Date
Implemented thus far are cohorts of the NFLC (37 faculty), two cohorts of the STEM FLC (30 faculty), and one cohort of the CLC (8 department chairs).

NFLCs:

- A. Participant satisfaction
- 1. 100% agreement that the NFLC provided a safe space for honest conversations about complex topics
- 2. 91% (Cohort 1) & 100% (Cohort 2) would recommend to others
- 3. 75% wanted another year-long FLC

B. Impact
Participants reported an increased sense of community & belonging, increased knowledge, increased efficacy, increased anti-biased behavior, and changes in their teaching practices.

STEM FLCs:

- A. Participant satisfaction
- 1. 85% would recommend the FLC to others
- 2. 63% wanted another year-long FLC
- 3. Community College faculty indicated a hesitation to engage in an FLC with DH colleagues because of a lack of confidence in their prior knowledge about these topics.

B. Impact
1. Increased knowledge and efficacy related to how people learn, culturally responsive teaching practices, systemic racism and sexism in education and affective/socio-emotional needs of students
2. Reported changes in teaching practices; re-evaluating course elements (e.g., grading practices); and more compassion, flexibility, and more holistic and understanding views of their students.

Chair Learning Community

- A. While participants enjoyed the community and the experience, they found it hard to find time to fully engage and to believe that they had the power to make a difference.
- B. Also noted was that the chairs who chose to participate are those who identify as BIPOC and/or female, raising the concern of cultural and identity taxation in leading this work.

Response to Findings and Next Steps
Faculty Learning Program (FLP)
The FLP provides FLCs for community college colleagues focusing on background knowledge that aligns with the content of the STEM FLCs. Launched in January 2023 with 90 participants across five FLCs.
CLC for STEM Chairs Supporting Black and African American Student Success
This CLC involves eleven chairs/directors in the College of Natural and Behavioral Sciences. It is held during chair's council meetings (participation of all is expected, no additional meeting time required), includes all chair, dean, and associate dean, and is cofacilitated by Kim Costino and the Vice President for Equity, Diversity and Inclusion.
Leadership FLC
This FLC will provide previous FLC/CLC participants the opportunity to go deeper and/or extend this work.



CAL STATE EAST BAY

COLLEGE OF SCIENCE

Equitable Assessment at CSUEB

The Cal State East Bay Equitable Assessment Team:
 Ana Almeida, Andrea Arauza Rivera, Derek Kimball, Erica Baranski, Fay Zhong, Gita Dunhill, Julie Glass, Simone Sisneros-Thiry, Stephanie Zaleski, Wendy Rummerfield

Scan this QR code for our contact information:

NOT YOUR EVERYDAY ASSIGNMENTS

Concept Maps
(Simone Sisneros-Thiry, Mathematics)

Guided Inquiry Laboratories
(Stephanie Zaleski, Chem. & Biochem.)

Backwards Design
(Ana Almeida, Biological Sciences)

Basic Features of Guided Inquiry Labs:

- Experiment title is a question
- Students **not** given a theoretical introduction
- During lab: "inquiry cycle" (see above)
 - Concept discovery and creation of analysis models happens *during* lab, not after
 - Students rely on each other as a resource.
 - Shared datasets often created
 - Instructor serves as a *facilitator*

ALTERNATIVE WAYS TO DEMONSTRATE KNOWING

Standards Based Grading
(Derek Kimball, Physics)

- In SBG, **scores go up** as students learn
- Benchmarks graded as pass/fail
- Teachers regularly provide feedback, reteach, and offer additional opportunities to reach "the next rung"
- Final grades reflect student mastery

Explicit Guidelines for Success through Rubrics
(Erica Baranski, Psychology)

Criteria for Success	Excellent	Good	Needs Improvement
Organization of Content	90%	80%	70%
Depth of Analysis	90%	80%	70%
Use of Evidence	90%	80%	70%
Clarity of Writing	90%	80%	70%

Visual Representations of Grading (Andrea Arauza Rivera, Mathematics)

OUTCOMES BASED GRADING

ATTAINMENT OF LEARNING GOALS

GRADE BREAKDOWN

Cal State East Bay

Embracing diversity in the Dolphin Pod: Increasing representation in CSUCI STEM majors

Amira F.A. Ibrahim, Thomas A. Clobes, Kevin T. Hayakawa, Peter A. Krause, & Ariel E. Vaughn
 CSU Channel Islands

National Grant Funded Efforts

Institutional/Departmental Efforts

Individual Faculty Efforts

- **NSF HSI-SMART: STEM Model for Research and Teaching Undergraduate Intervention Program**
- HSI-SMART is program focused on assessing the efficacy of various interventions which aim to increase the diversity in STEM majors at CSUCI with underrepresentation of Latinx and female students. The program is made up of four interventions:
 - Creating connections between incoming freshmen and transfer STEM students with STEM faculty
 - Scholarships for 1 to 2 year STEM research experiences
 - Placing Learning Assistants/Embedded Peer Educators in high level STEM gateway courses
 - Series of Belonging and Math/Text Anxiety Intervention
- **NIH Initiative to enhance diversity in biomedical research workforce at CSU Channel Islands**
- The *Initiative to enhance diversity in biomedical research workforce at CSU Channel Islands* is designed to promote success and retention of historically underrepresented students in biomedical majors (Psychology, Health Science, Biology, Chemistry, Math, and Applied Physics) through a hands-on Biomedical Research Bootcamp where students are introduced to biomedical research with active lab activities and engagement with professionals in the field. This project also includes a faculty training program focused on mentoring diverse students and incorporating high-impact Course-based Undergraduate Research Experiences (CUREs) into biobehavioral courses.
- **Embedded Peer Tutoring in Gateway Quantitative Courses**
- The CSUCI Learning Resource Center (LRC) offers an extensive Embedded Peer Tutor (EPT) program to support virtual and/or in-person course sections, especially in first-year writing and quantitative reasoning courses. Internal research has shown that passing first-year English and Math courses is a strong predictor of graduation within 6 years. Conversely, earning a D, F, or W in a first-year English and/or Math course increases the likelihood of the student dropping out. EPTs attend all synchronous lectures with enrolled students and support student engagement and learning in a variety of ways.
- **Psychology Transfer Learning Community**
- The Psychology Program launched the Transfer Learning Community (TLC) in Fall 2020, which is the first learning community for transfer students at CI. Our goal with the TLC is to build a sense of community and support, especially in the absence of being physically present on campus during the COVID pandemic. Since then, a group of 24 transfer students majoring in Psychology have been selected to participate in the TLC each year. Some of the benefits of being part of this program would include:
 - Connecting with a peer network for support and study groups.
 - Completing critical coursework early on during their studies.
 - Establishing mentoring relationships with faculty.
- The TLC further provides transfer students with an opportunity to take an established track of critical gateway courses over the first two semesters.
- **Course-based Undergraduate Research Experiences (CUREs) in Health Sciences**
- Design and implementation of Course-based Undergraduate Research (CUREs) in a medical cannabis course at a Hispanic Serving Institution led to student engagement, student-led research, and several viable research proposals for more advanced research.
- **Research on Course and Homework Redesign in Chemical Education**
- There is a known disconnect between the real-world applications of chemistry and what is traditionally taught in the classroom. Chemical education research by The Vaughn Lab (Dr. Vaughn) at CSUCI is working to bridge that gap through homework assignment design.
- Homework assignments that allow students to see themselves as chemists and identify chemistry in the world around them can change how students perceive chemistry as a course and as a potential career option. Homework assignments also have the potential to be used at a variety of institutions with both larger and smaller amounts of departmental resources.
- By analyzing student responses by categories such as scientific language usage, type of example, and connection to the material in class, we can see students grow as scientists and identify areas in which students have trouble making real-world connections.
- **Rethinking Office Hours in Technical Upper-Division Psych Courses**
- To offset the disadvantages posed by the "hidden curriculum" to first-generation students, some psych faculty have been pursuing an approach whereby students in upper-division courses in cognition and research methods are required to complete at least one one-on-one meeting with the Professor within the first third of the semester.
- Office hour attendance has substantially improved, and several students have cited this policy as a motivating factor in later seeking letters of recommendation.



Supporting Student Success Through Experiential Learning in the College of Science
 Presenters: Shahidul Islam, Nathaniel Jue, and Arun Sharma
 islami@csumb.edu; njue@csumb.edu; arsharma@csumb.edu

Mission
 The College of Science leverages the unique strengths of the Monterey Bay region to provide an inclusive and hands-on learning environment that cultivates scientific curiosity, social responsibility, and lifelong learning.

Student Body

Computing Talent Initiative (CTI)
Goal: Preparing computer science students, in particular students from community colleges and state universities, to be competitive for opportunities in the tech industry.
Components:
 1. Accelerate Internship Prep curriculum (Figure 3)
 2. Micro Internships (Figure 4)
 3. Traditional Tech Internships
 4. CTI Open Source Apprenticeship Program
 5. REIS
 6. COOP Programs/Learning Communities
 7. Bridge Experience for Computer Science (BECS)

Course-Based Undergraduate Research Experiences (CUREs)
 COS faculty have been particularly committed to democratizing access for undergraduate students to research experience through the development of CUREs across our curricula. Specifically, within the Biology and Chemistry (BIOC) Department, instructors have participated extensively in the CSUMB CURE Institute leading program, accounting for almost a quarter of the total participants, and, through institutional and grant support or personal interest, have developed scaffolded CURE experiences in more than 20 courses within our curriculum (Figure 5). Outcomes have supported the improved development of participating student's identities as scientist (Figure 6).

Graduation Initiative 2025

Commitment to Student Success through Experiential Learning
 As like many science faculties, ours is committed to student success and see practical applications and experiences as being an established high impact educational practice. Along with opportunities for service learning, independent research, internships, and numerous other institutional supports, our faculty has also been committed to developing our program specific opportunities for students.
 We will highlight two such efforts here:
 1. The School of Computing and Design Computing Talent Initiative
 2. Course-Based Undergraduate Research Experiences (CUREs) with the Biology curriculum

Building a Strong Foundation for Success: A Look at STEM Research and Education at Cal State LA
 Oleseni Sode, Ph.D.
 California State University, Los Angeles

Overview
 Cal State LA, California State University, Los Angeles, offers a range of STEM programs that provide students with valuable opportunities to engage in research, gain practical experience, and develop their skills in various fields. The REU program in Chemistry and Biochemistry and the CREST Center for Advancement Toward Sustainable Urban Systems (CATSUS) are two such programs that offer high-quality research and hands-on learning experiences to students interested in STEM. The SPROUT program provides students with opportunities to work on interdisciplinary projects and collaborate with peers from other departments. The Urban Hydration program offers students the chance to learn about water management and environmental systems. Together, these programs promote the growth and development of students in the STEM field.

Summer Research Programs: REU and SPROUT
 Summer research programs at Cal State LA offer students a unique opportunity to dive into the world of research and innovation. These programs allow students to work closely with faculty mentors, collaborate with peers, and gain practical experience in their field of interest. From civil engineering to computational science, these programs provide students with diverse research opportunities to explore.

Partnerships for Research and Education in Chemistry (PREC)
 Cal State LA and the Molecular Software Science Institute (MOSSI) at Virginia Tech collaborate to incorporate machine learning techniques in molecular simulation research and develop innovative pedagogical materials to train early-stage undergraduate students in computational science.

CREST Center for Advancement Toward Sustainable Urban Systems (CATSUS)
 The NSF REU: Response of Hydrological Systems in Urban Areas Due to Human Disturbance and Climate Change provides students with a research and cultural experience under the guidance and mentorship in water-related fields, such as hydrology, watershed analysis, and hydrologic modeling.

LAUNCHPAD
 The Cal State LA, College of Engineering, Computer Science, and Technology (ECST) LaunchPad Summer Program is a two-week in-person (IP) and virtual (VP) summer program at Cal State LA where middle school and high school students explore the fields of civil engineering, computer and electrical engineering, computer science, materials science, mechanical engineering, technology and discover how choosing to study in these majors looks like in a career after college.





















































