

Online STEM Learning Of Hispanic Students

Anna Ya Ni

California State University San Bernardino

- Growing importance of online learning
- Influence of the Covid-19 pandemic on higher education
- Disciplinary differences and the challenges of online STEM education
- Challenges of Hispanic students in online and STEM education
- Purpose of this study (NSF Pilot Project)

Core Themes and Disciplines



Lecture Strategies



Testing Strategies



Rehearsal Strategies



Lab Strategies



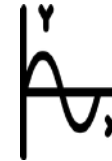
Inclusion and Belonging



Computer Science and Engineering (CSE)



Information and Decision Sciences (IDS)



Mathematics



Psychology

- **CSUSB (HSI) Student Survey**

- Final cleaned sample size: **N = 1256 (60% Latinos)**

- **N = 739** have had multiple online courses in target disciplines

- Detailed response rates [available here](#)

- Includes *bonus* discipline of geography and envir. science (n = 85)

- **CSUSB Faculty Survey**

- 58 usable responses; 9 - 21 per discipline

- ***Bonus* UCR (HSI) Student Survey**

- Approximate sample size: N = 380

- Variety of STEM majors; primarily biology

Key Findings: Lectures

- Students are **split** in their preferences about **online lecture format** (async vs. sync) (Math students have a stronger preference toward **synchronous lectures**)
- Most students (59%) agree that **in-person lectures are better** than online lectures (Math students prefer in-person while **IDS** students prefer on-line more)
- **Instructor responsiveness to questions (sync) and Sound and video quality** are important for my learning in online lectures
- Students **often encounter technical problems** that interfere with their learning in online courses (46% agree that **instructor or institutional** tech problems often interfere, 55% agree that **their own** tech problems often interfere)

- Students generally find rehearsal activities **helpful to their learning**, especially when they are graded/required
- **Instructor-made study guide is the most preferred format**
- Students generally feel that instructor-provided rehearsal material is **equally important** in online and face-to-face courses (But report that on average, just **66%** of their online classes provide good quality study materials)
- **CSE** are least likely to receive quality study materials in their online courses (**62%**), **Psychology** reports highest (**71%**)

- Students generally **prefer online exams** and many (51%) feel they perform better on online exams
- Students report **more anxiety** taking in-person exams
- However, online and in-person exams are viewed roughly equivalent in **fairness, prep time**, and as a **reflection of learning**
- While most students prefer online exams, **math** students are far more neutral (Accordingly, **math** students also report: 1. in-person exams are a better reflection of their learning, 2. relatively less anxiety during in-person exams, and 3. their exams are less based on objective questions)

Key Findings: Labs (N=338)

- Most students believe **online labs can be done well**, but opinions were somewhat tempered
- Students reported **good support and preparation** from their online lab instructor/TA
- Students are very enthusiastic about **recorded labs**, but have **split** preferences on lab format (async/sync)
- No significant disciplinary differences in labs (**IDS** students were slightly more favorable toward online labs, generally, **Psychology** students slightly more likely to prefer synchronous labs)

Key Findings: Inclusion

- Majority of students feel a sense of **inclusion and belonging** in online classes (67% of students agreed online classrooms are free from tensions related to group differences)
- A small portion of students have encountered **discrimination or harassment** in their online classes (3% have experienced and or observed discrimination, 10% felt their opinion/contribution were minimized)[No difference based on URM, first gen, gender, or gender/sexual minority]
- **Math** students expressed the lowest sense of inclusion and belonging and were most like to **feel minimized** in their online classes

- **Limitations**

- Sample bias
- One institution context

- **Next Steps**

- Deeper data dive
 - Comparison of Hispanic vs non-Hispanic students
 - Qualitative data analysis
- Design discipline-based model online courses

Supporting URM Students in Enhancing Their Science Identity Development and Motivation to Pursue STEM Careers

NSF Award #: 2247282 & 2247283

Lexi Hwang, Ph.D (PI), Associate Professor in College of Education, Cal State LA

Jeffrey Santner, Ph.D (Co-PI), Associate Professor of Mechanical Engineering, Cal State LA

Leo Hong, Ph.D (Co-PI), Assistant Professor of Mechanical Engineering, Loyola Marymount University



Overview of Project SPACE



The project SPACE, “**Simulation-Based Pedagogical Approach in Chemistry Education for All Students to Succeed in STEM**”, is funded by National Science Foundation (Award #s: 2247283 and 2247283; 2023-2025).



Project SPACE aims to enhance undergraduate students' understanding of chemical reactions and their application to solving advanced scientific problems using training in **computational modeling and simulation skills** in conjunction with **asset-based pedagogical support and strategies**.



The program incorporates four main components, **a. asset-based framework**, **b. pedagogical strategies**, **c. engineering skills**, and **d. engineering fundamentals** not only to provide intensive learning support but to create a learning space where URM students can affirm and/or develop their science identity by using funds of science knowledge

Project Team



Dr. Lexi Hwang (PI)
Associate Professor of
Education, Cal State
LA



Dr. Jane Dong (PI)
Dean & Professor of
Engineering,
CSUB



Dr. Leo Hong (Co-PI)
Assistant Professor of
Mechanical Engineering,
Loyola Marymount
University



Dr. Jeffrey Santner (Co-PI)
Associate Professor of
Mechanical Engineering,
Cal State LA



Marlen Trigueros
(Undergraduate
at Cal State LA)



Arpit Vaishya
(M.S. student at
Cal State LA)



Priyanshu Luhar
(Undergraduate at
CSUB)



Karen Flores
Estrella
(Undergraduate at
CSUB)



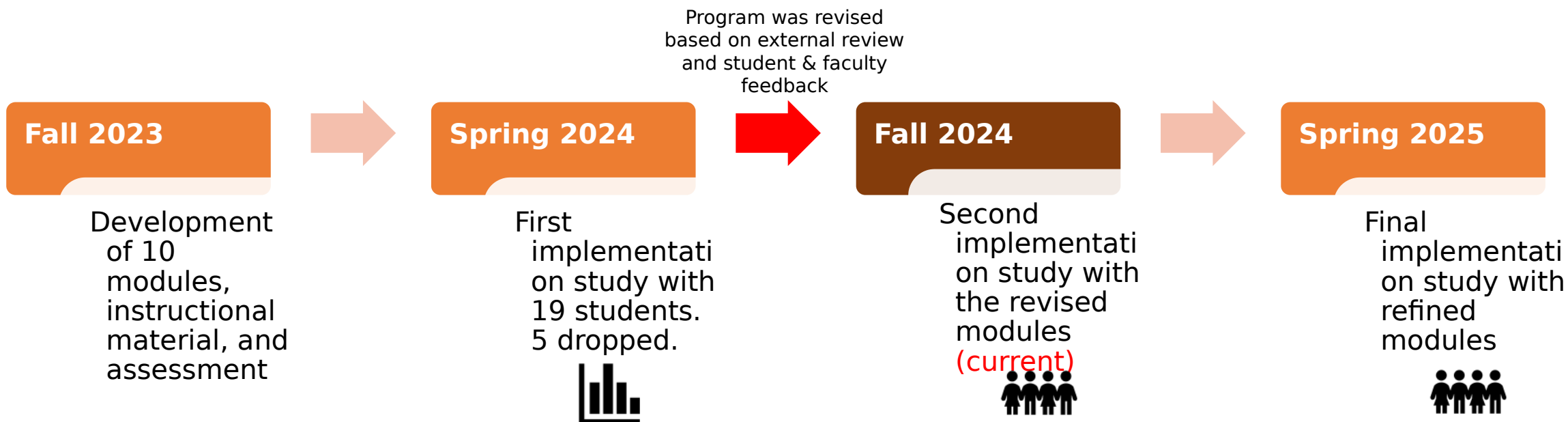
Ricardo Ramirez
(Undergraduate at
CSUB)



Project SPACE (Award #: #2247282 and #2247283)
© Drs. Hwang, Hong, and Santner



Project Status & Progress



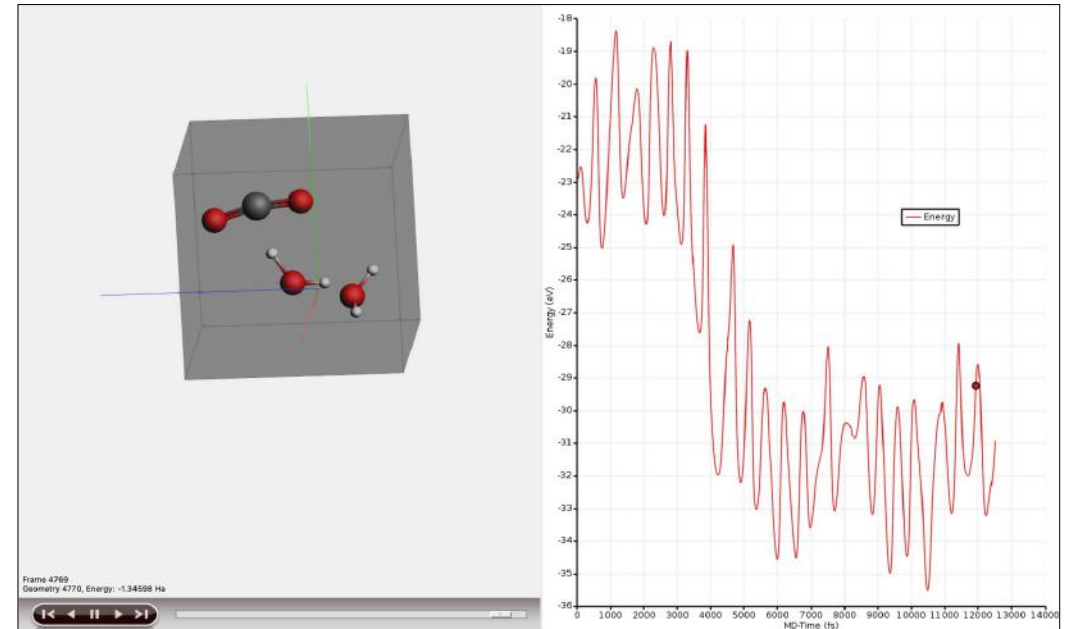
Data collected via test, survey, and interview

- General chemistry knowledge
- Chemical equation balancing skills
- Contextualized problem-solving skills
- STEM motivation
- STEM identity



Computational Modeling and Simulation : Reactive Molecular Dynamics

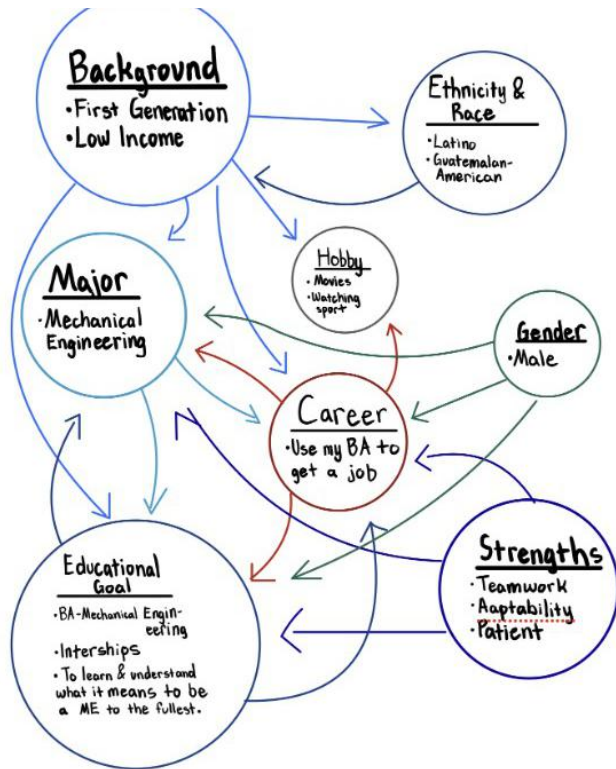
- Example of RMD application on Mechanics of Engineering Materials
 - Damage impact on a slab via water bubble



A. Shekhar et al., Phys. Rev. Lett. **111**, 184503 ('13)



STEM Identity Exercise Example



1. Develop a graphic representing your identity and how elements of your identity intersect (e.g., ethnicity/race, family background, gender, religion, hobby, majors, strengths).

2. Think about how those elements intersect with STEM by asking:

- Performance: How capable do I believe I am to perform STEM tasks?
- Competence: How capable do I believe I am to understand STEM content?
- Recognition: How am I recognized by others and myself as being a STEM person?
- Content interest: How curious am I about STEM content?

3. Summarize it in 1-2 paragraph(s), then discuss how your image would change if you were not pursuing STEM majors or STEM careers after graduation.



Inspirational Reading Example : "MVP of The Week"



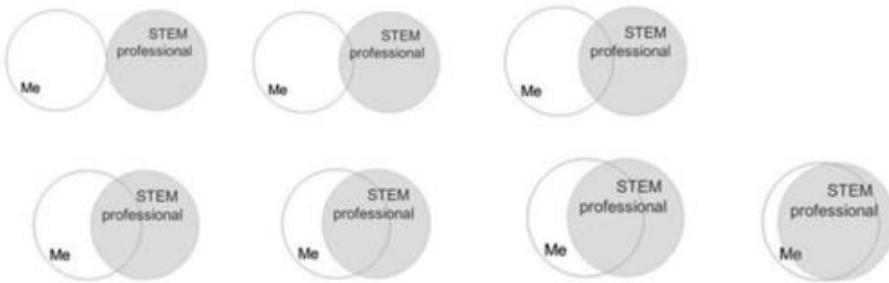
Advice to young women

- **Zelaya:** Zelaya said hard work and dedication always pay off. "If you like it, master it, Know everything about it."
- **Maza:** "Be persistent," Maza said. "Lots of mistakes are going to happen, and try not to let that get to you."
- **Mann:** "Keep knocking on doors," Mann said. "Some of them will open. They will open. And fortunately, we live in a country where you can start again from zero, career-wise, at any point of your life."



Preliminary Findings - Still in Progress

- A significant increase in science identity
 - Among the five pictures (Van Diagrams) shown below, select the picture that best describes the current overlap of the image you have of yourself and your image of what a STEM professional is.



- An overall increase in science motivation
 - Intrinsic motivation (e.g., learning science is interesting)
 - Career motivation (e.g., learning science will help me get a good job)
 - Self-determination (e.g., I study hard to learn science)
 - Self-efficiency (e.g., I am confident I will do well on science test)
 - Grade motivation (e.g., getting a good science grade is important to me)

“I can say I am finally a scientist doing real stuff. I know scientists probably use a similar program...”

“...trying it out on the simulation and then having to actually present it which was the part where I felt like this is actually makes me feel like a professional....”

“...I guess the community around that we made everyone was kind and everybody was nice so it just contributes to my feelings of encouragement...”



Student outcome

- A student first-authored paper published in MRS Advances
 - Priyanshu Luhar, an undergraduate student at CSUB trained under the SPACE program, developed his own research topic in computational chemistry and published his work in a scientific journal.

MRS Advances
<https://doi.org/10.1557/s43580-024-00840-1>



ORIGINAL PAPER



Energetic performance of reactive metal nanoparticles: Computational materials research integrated with science pedagogy

Priyanshu Luhar¹ · Arpit Valshya² · Karen Flores³ · Marlen Trigueros⁴ · Jeffrey Santner⁵ · Sungwook Hong³
Jlwon Hwang⁶

Received: 10 January 2024 / Accepted: 26 March 2024

This is a U.S. Government work and not under copyright protection in the US; foreign copyright protection may apply 2024

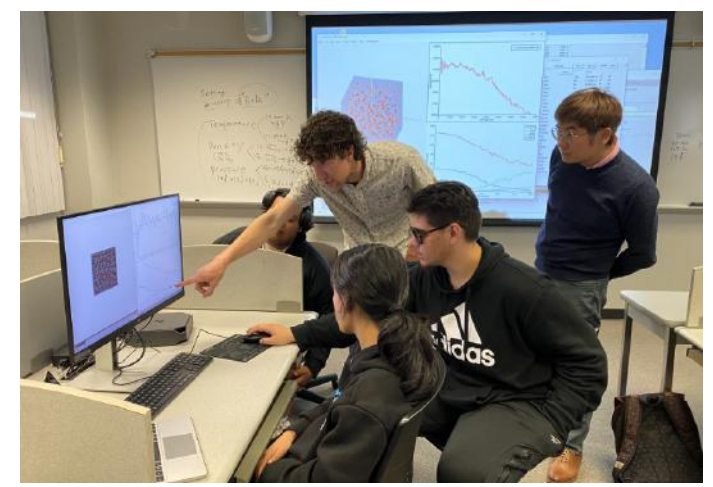
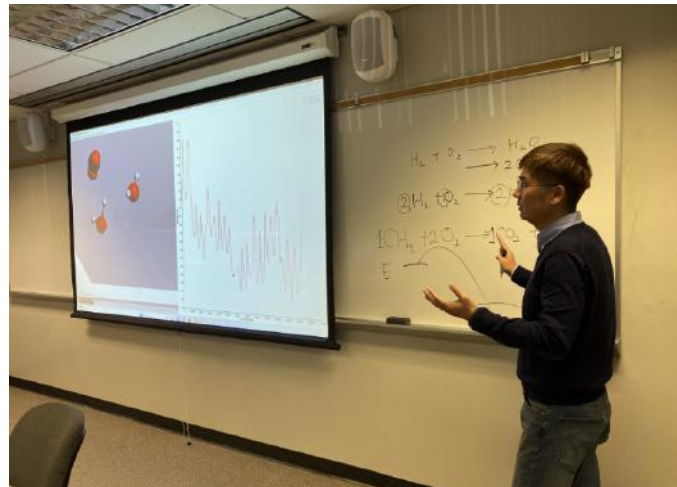
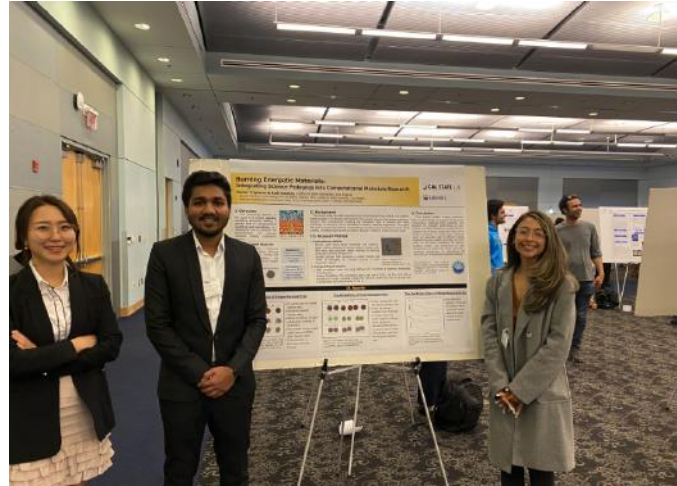
Abstract

We aim to develop and implement a program using reactive modeling dynamic (RMD), one type of computational modeling and simulation techniques, to help college students learn chemical reactions in materials science. Prior to the first implementation of the program, four college students from different engineering majors were selected and trained with RMD, research, and leadership skills utilizing our pedagogical approach. The current study presents the findings of their culminating projects as outputs, where students generated inquiry from their own experiences leading to authentic questions and opportunities to explore and discover material processes. The energetic performance of various metal nanoparticles using RMD is presented and discussed.



Closing Remark

- Challenges
 - Student recruitment (e.g., time and compensation)
 - Schedule conflict to offer this extracurricular program
 - More department or college level of support for HSI related or K-12 community related education grant opportunity
- Future work
 - More collaboration across disciplines and campuses!
 - K-12 school and community outreach





Networking with California State University (CSU) Hispanic-Serving Institutions for STEM Success: The STEM-NET Consortium Think Tank (Hub)

Friday, September 20, 2024

Presented by:
Drs. Yolanda Cataño & Frank A. Gomez



STEM-NET CONSORTIUM

CSU Chancellor's Office



Mission

STEM-NET empowers CSU STEM leaders to harness their expertise in pedagogy, research, and grant writing to ensure the success of our students and faculty.





Vision

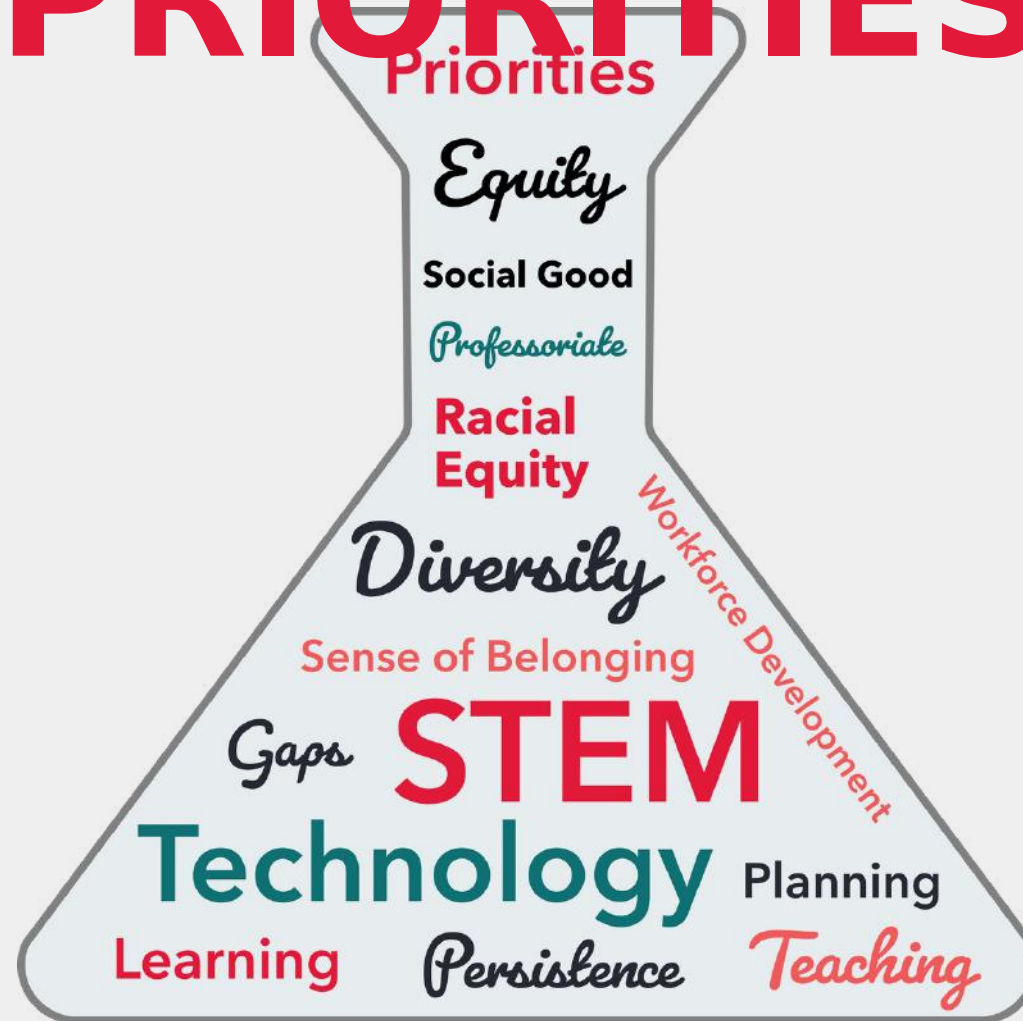
Driven by an unwavering commitment to student success, STEM-NET will transform the CSU into a preeminent champion of inclusive access to research and learning experiences that equip diverse STEM students for thriving careers in STEM-related fields.



STRATEGIC GOALS

- Foster and support CSU-wide research, scholarship, and collaboration in STEM that support the vision.
 - Promote, foster, and support faculty development to improve STEM teaching, learning, retention, and graduation across the CSU.
 - Develop long-term sustainable funding for STEM-NET.
 - Communicate with and engage key stakeholder groups in collaborative strategies supporting STEM-NET's vision.
 - Promote and develop collaborative partnerships to increase capacity for K-12 STEM teacher preparation and fortify the pathways into CSU STEM programs.
- 
- 

CURRENT PRIORITIES



STEM-NET

STEM-NET





STEM-NET, HSI-HUB

Who are we? What do we do?

THINK TANK (HSI-HUB)


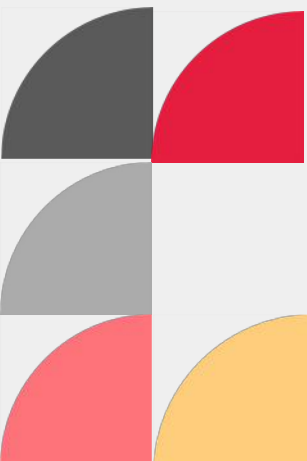
- Broker ideas.
- Stimulate debate.
- Offer creative yet practical solutions to tackle the most pressing problems in STEM education.





WHY A “HUB”

At the STEM-NET, HSI-Hub, we recognize the importance of STEM in driving progress and innovation. **The hub is an inclusive and dynamic space that empowers Latinx/e and low-income students to excel in STEM fields.**



1 · Spread of Knowledge

To facilitate the spread of knowledge and associated evidence-based interventions on a wide scale across the CSU system.

2 · Intervention Materials

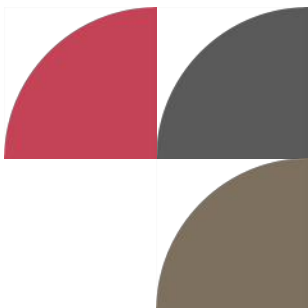
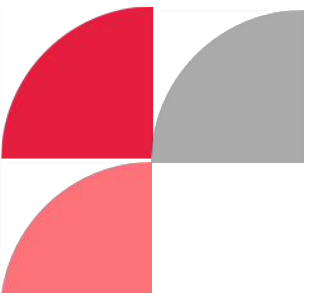
To distribute information and intervention materials to targeted audience(s).

3 · Best Practices

To enable access of best practices to decision makers in the CSU.

4 · Expand Partnerships

Build and expand partnerships for the implementation work needed for the future.



Leadership Team



7 OUT OF 12

Are CSU Partners



CSU Fullerton

- Dr. Megan Drangstveit

CSU San Bernardino

- Dr. Sastry Pantula

Cal Poly Pomona

- Dr. Winny Dong

Sacramento State

- Dr. Lynn Tashiro

Stanislaus State

- Iqbal Atwal

CSU Bakersfield

- Dr. Charles Lam

CSU San Marcos

- Dr. Suzanne Hizer



Chancellor's Office

STEM-NET Executive Director

- Dr. Frank A. Gomez

DOE, HSI-STEM & Articulation Program Grant Manager

- Dr. Yolanda Cataño

Operations Analyst

- Monica Alarcon



STEM-NET, HSI-HUB LOGIC MODEL

What are our priorities?

Inputs	Activities	Outputs	Short-Term Outcomes	Long-Term Outcomes
<p>1. Funding & Grants</p> <ul style="list-style-type: none"> Title III, part F Grant Funding – HSI-STEM & Articulation Grant Projects Additional funding sources and grants <p>2. Institutions & Partners</p> <ul style="list-style-type: none"> 23 Campuses 7 CSU Partners (Current) 12 Sub awardees (DOE) 9 CSU Campus (2 Pending Approval) Industry Partners & MOUs California Community Colleges <p>3. Human Resources</p> <ul style="list-style-type: none"> Think Tank Hub Development Team Collaborators with STEM expertise Research and Publication Teams <p>4. Infrastructure</p> <ul style="list-style-type: none"> Technological Support (website, data dashboard, repository) Conference and Dissemination Support 	<p>Planning & Development</p> <ul style="list-style-type: none"> Develop a master calendar with meeting dates, times, and locations Create hub identity and name Plan and conduct campus site visits Seek funding opportunities <p>Communication & Collaboration</p> <ul style="list-style-type: none"> Develop hub website for dissemination of best practices Administer communication and feedback platform (e.g., SharePoint, emails, Smartsheet, google drive) Participate in STEM-NET Consortium activities (e.g., podcasts, webinars) <p>Research & Reporting</p> <ul style="list-style-type: none"> Create annual research/data reports Contribute to STEM-NET Conference Inclusion and participation with Minority-Serving Institutions Contribute to the Department of Education (DE) <p>Engagement with Community Colleges</p> <ul style="list-style-type: none"> Develop calendar and participation plans with community college partners Create plans for collaboration with CSU partners <p>Data & Metrics</p> <ul style="list-style-type: none"> Establish parameters for data collection with CSU Chancellor's Office Develop CSU HSI-STEM Dashboard <p>Publications & Presentations</p> <ul style="list-style-type: none"> Identify publication sites Plan for student research presentations Submit conference proposals and disseminate best practices 	<p>Documentation & Resources</p> <ul style="list-style-type: none"> Travel and financial plans for in-person visits Information collection and dissemination MOU templates and comprehensive lists of industry contacts Increase network and collaborative efforts across the CSU <p>Web and Technological Outputs</p> <ul style="list-style-type: none"> Functional Hub Website CSU HSI-STEM Dashboard <p>Reports and Publications</p> <ul style="list-style-type: none"> Annual research/data reports Conference presentation proposals (e.g., AHSIE, HACU, DE, NSF, etc.) White papers, peer-reviewed articles, newsletters, etc. <p>Event Participation</p> <ul style="list-style-type: none"> Participation in webinars, podcasts, and STEM-NET Consortium activities Participate in activities from grant projects 	<p>Network & Collaboration</p> <ul style="list-style-type: none"> Strong and sustainable network across all CSUs Advancing Higher Education Act (HEA) policy and HSI STEM initiatives <p>Support for Student Success</p> <ul style="list-style-type: none"> Increased support for student success programs <p>Visibility & Awareness</p> <ul style="list-style-type: none"> Increased visibility and awareness of Title III, HSI-STEM Grant programs at CCCs Documentation of systemwide information <p>Industry Engagement</p> <ul style="list-style-type: none"> Increased industry partnerships <p>Alignment with Initiatives</p> <ul style="list-style-type: none"> Alignment with CSU Graduation Initiative 2025 Alignment with STEM-NET Consortium strategic planning Alignment with Executive Order (14045) at the U.S. Department of Education, the White House Initiative of Advancing Educational Equity, Excellence, and Economic Opportunity through HSIs Improved data collection and usage 	<p>Sustainability & Institutionalization</p> <ul style="list-style-type: none"> Institutionalization of grant projects, services, and programming Sustainable partnerships with industry and community colleges <p>Impact on Students</p> <ul style="list-style-type: none"> Improved graduation rates of Latinx/e and low-income student population in STEM Increased support and opportunities for underrepresented student groups Implementation of Servingness framework from an HSI & STEM lens Elimination of equity gaps for STEM, Latinx/e, and low-income students <p>Research & Best Practices</p> <ul style="list-style-type: none"> Effective dissemination of best practices High impact evidence-based interventions across CSU system <p>Strengthened Standing & Impact for CSUs</p> <ul style="list-style-type: none"> Increased visibility and influence of HSI-STEM projects locally, statewide, and nationally Increased efficacy and competitiveness of HSI-STEM grants for continued support and funding

Logic Model

Inputs	Activities	Outputs	Short-Term Outcomes	Long-Term Outcomes
<p>1. Funding & Grants</p> <ul style="list-style-type: none"> Title III, part F Grant Funding – HSI-STEM & Articulation Grant Projects Additional funding sources and grants <p>2. Institutions & Partners</p> <ul style="list-style-type: none"> 23 Campuses 7 CSU Partners (Current) 12 Sub awardees (DOE) 9 CSU Campus (2 Pending Approval) Industry Partners & MOUs California Community Colleges <p>3. Human Resources</p> <ul style="list-style-type: none"> Think Tank Hub Development Team Collaborators with STEM expertise Research and Publication Teams <p>4. Infrastructure</p> <ul style="list-style-type: none"> Technological Support (website, data dashboard, repository) Conference and Dissemination Support 	<p>Planning & Development</p> <ul style="list-style-type: none"> Develop a master calendar with meeting dates, times, and locations Create hub identity and name Plan and conduct campus site visits Seek funding opportunities <p>Communication & Collaboration</p> <ul style="list-style-type: none"> Develop hub website for dissemination of best practices Administer communication and feedback platform (e.g., SharePoint, emails, Smartsheet, google drive) Participate in STEM-NET Consortium activities (e.g., podcasts, webinars) <p>Research & Reporting</p> <ul style="list-style-type: none"> Create annual research/data reports Contribute to STEM-NET Conference Inclusion and participation with Minority-Serving Institutions Contribute to the Department of Education (DE) <p>Engagement with Community Colleges</p> <ul style="list-style-type: none"> Develop calendar and participation plans with community college partners Create plans for collaboration with CSU partners <p>Data & Metrics</p> <ul style="list-style-type: none"> Establish parameters for data collection with CSU Chancellor's Office Develop CSU HSI-STEM Dashboard <p>Publications & Presentations</p> <ul style="list-style-type: none"> Identify publication sites Plan for student research presentations Submit conference proposals and disseminate best practices 	<p>Documentation & Resources</p> <ul style="list-style-type: none"> Travel and financial plans for in-person visits Information collection and dissemination MOU templates and comprehensive lists of industry contacts Increase network and collaborative efforts across the CSU <p>Web and Technological Outputs</p> <ul style="list-style-type: none"> Functional Hub Website CSU HSI-STEM Dashboard <p>Reports and Publications</p> <ul style="list-style-type: none"> Annual research/data reports Conference presentation proposals (e.g., AHSIE, HACU, DE, NSF, etc.) White papers, peer-reviewed articles, newsletters, etc. <p>Event Participation</p> <ul style="list-style-type: none"> Participation in webinars, podcasts, and STEM-NET Consortium activities Participate in activities from grant projects 	<p>Network & Collaboration</p> <ul style="list-style-type: none"> Strong and sustainable network across all CSUs Advancing Higher Education Act (HEA) policy and HSI STEM initiatives <p>Support for Student Success</p> <ul style="list-style-type: none"> Increased support for student success programs <p>Visibility & Awareness</p> <ul style="list-style-type: none"> Increased visibility and awareness of Title III, HSI-STEM Grant programs at CCCs Documentation of systemwide information <p>Industry Engagement</p> <ul style="list-style-type: none"> Increased industry partnerships <p>Alignment with Initiatives</p> <ul style="list-style-type: none"> Alignment with CSU Graduation Initiative 2025 Alignment with STEM-NET Consortium strategic planning Alignment with Executive Order (14045) at the U.S. Department of Education, the White House Initiative of Advancing Educational Equity, Excellence, and Economic Opportunity through HSIs Improved data collection and usage 	<p>Sustainability & Institutionalization</p> <ul style="list-style-type: none"> Institutionalization of grant projects, services, and programming Sustainable partnerships with industry and community colleges <p>Impact on Students</p> <ul style="list-style-type: none"> Improved graduation rates of Latinx/e and low-income student population in STEM Increased support and opportunities for underrepresented student groups Implementation of Servingness framework from an HSI & STEM lens Elimination of equity gaps for STEM, Latinx/e, and low-income students <p>Research & Best Practices</p> <ul style="list-style-type: none"> Effective dissemination of best practices High impact evidence-based interventions across CSU system <p>Strengthened Standing & Impact for CSUs</p> <ul style="list-style-type: none"> Increased visibility and influence of HSI-STEM projects locally, statewide, and nationally Increased efficacy and competitiveness of HSI-STEM grants for continued support and funding

Logic Model

HUB CONNECTIONS

CSU The California State University

CSU Think Tank Hub



Think Tank Hub

Repository

Dissemination of Best Practices

Create

Document

Share



STEM-NET, HSI-HUB WEBSITE

Review website and materials



SCAN HERE!

STEM-NET



SCAN HERE!

HSI-HUB

SERVINGNESS

CSU The California State University
OFFICE OF THE CHANCELLOR

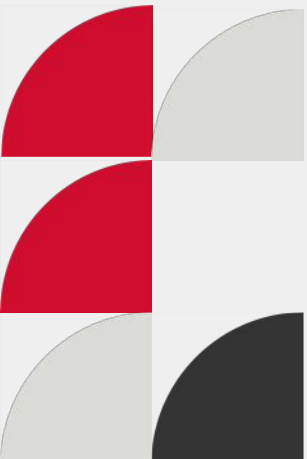
Hub Retreat



STEM-NET



GRACIAS





Team Internships & Go Baby Go enable career exploration, cross-cultural collaboration, and professional connections

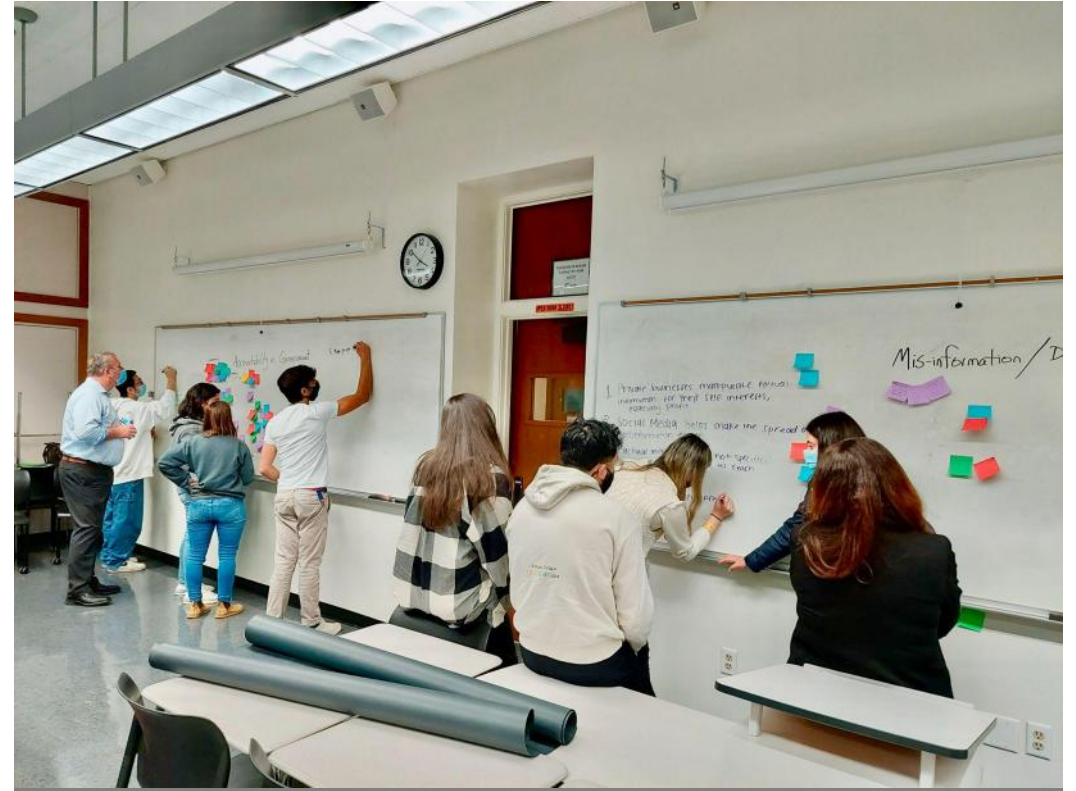
Sept. 20, 2024
2024 NSF Regional HSI Conference

Michael Davis, Mathematics

Nareh Manooki, Engineering

Chris Herwerth, Engineering

Office of Hispanic-Serving
Initiatives



GCC's Team Internship and Go Baby Go Internship program were developed under grants from the U.S. Department of Education: Title V Adelante GCC & Title III BIEN in STEM.

glendale.edu

TEAM INTERNSHIPS (INT 51)



Structure:

- Ten weeks
- Cohort capacity = 25 interns
- 5 teams of five

Benefits:

- Early career experience motivates academic success
- Interns learn transferable skills
- Networking opportunities
- 1-unit transfer credit

TEAM INTERNSHIP

Program Participant Stats: Spring 2022 - Fall 2024

Over **300** applicants

11 Faculty Coaches trained

Fourteen Peer Mentors

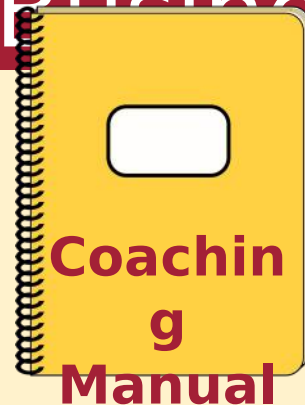
recruited

Over **200 Interns**
accepted

Active Community of Practitioners

12 Businesses

Partners



TEAM INTERNSHIPS (INT 51)

Recruiting Applicants:

- Priority application window
- Word of mouth
- On-campus advertising
- Warm encouragement
- Social Media

promiseplus+

GLENDALE COMMUNITY COLLEGE
Student Equity Department

LA COMUNIDAD

APIDA COMMUNITY

BLACK SCHOLARS



TEAM INTERNSHIPS (INT 51) *Outcomes & Impact*

Students develop
transferable Professional Skills

- Problem analysis
- Solution generation
- Empathy
- Group communication
- Public speaking

Faculty dialog with
Industry Partners

- Informs curricular updates
- Establish professional connections to help mentor students through professional panels and informal networking

Industry career
Pipelines grow

- Gain business solutions with fresh thinking
- Supports more paid work opportunities for GCC students



CEREBRAL PALSY FOUNDATION

DISCOVERY FOR DISABILITY

VIDEO LIBRARY

CP PERFECT PRODUCTS

PRODUCT OF THE MONTH

GO BABY GO

Founded 2012 by Dr. Cole Galloway,
Professor of Physical Therapy



- Provides modified, ride-on cars to young children with disabilities so they can be independently mobile.
- No other devices available to young children for independent mobility.

Baby Go at GCC

2023 Mentee students:

Using vehicle for project: Mentoring students of Color in STEM (M-STEM) program

Helped locally adopt national program.

Used hands-on technical as well as soft skills.

Increased self-confidence in problem-solving.



2023 Mentee students:

Helped order three modified ride on cars.

Helped document and develop guides for the mentoring program to grow GBG.

Helped train to be mentor for next group of students.



Team Internships + GoBabyGo = GoBabyGo INTERNSHIPS

Equity-minded, on-campus, student centered.

Spring 2024, GCC

- Mentees became peer mentors
- Five teams of five student-interns paired with a peer mentor, faculty facilitator, and faculty coaches to modify five cars
- STEM Students got paid to work on campus, gain technical and soft skills in technology, physical therapy, and professionalism
- Students delivered five cars to five children and reflect sense of pride, accomplishment, and motivation to



GoBabyGo INTERNSHIPS; Outcomes and Impacts

GoBabyGo Project presents an opportunity for Engineering Design Project for First Year Students

Benefit for underrepresented students to learn basic engineering tools and mentorship or increased contact with faculty

Real project with cultural and human focused engineering applications

Supports underrepresented students communication and team skill building

Related to ABET outcomes

- an ability to communicate effectively with a range of audiences.
- an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

Allows branding of engineering department & GCC focused on helping people.





Fall 2024 and on...

Training Peer Mentors for GBG Internships in Spring '24

Two sections of INT 51 currently running with business partners

STEM Success Outcomes

STEM Students from diverse disciplines (e.g. engineering and kinesiology etc) learn to leverage their collective strengths in service of children with special needs, gaining confidence and a sense of being positive contributors to needs in our community.

Cross-cultural collaboration involves students in helping to build a more inclusive world.



GCC's Team Internship and Go Baby Go Internship program were developed under grants from the U.S. Department of Education: Title V Adelante GCC & Title III BIEN in STEM.

A background image featuring a network diagram with white human figures connected by lines on a dark grey grid. A small blue horizontal line is located at the top left of the slide.

Implementing a Faculty Learning Community for Equity-Curious Faculty in STEM

Virginia White, Luis Molina
Riverside City College

Project Overview

- The Riverside City College STEM Division has two federal grants with faculty development components
 - NSF HSI (2122940); Dept of Education Title III (P031C2100178)
- STEM Faculty Learning Community
 - One to two years of paid participation
- STEM Faculty Inquiry Group
 - Unpaid, continuing engagement with equity work





Laying the Foundation- Year 1

- Three faculty leads(Biology, Mathematics, Physics)
- Met every other week as a Faculty Learning Community
- In year 1, the PI, Co-PIs were trained and explored evidence-based teaching practices (EBTs) in fall; EBT implementation happened in spring

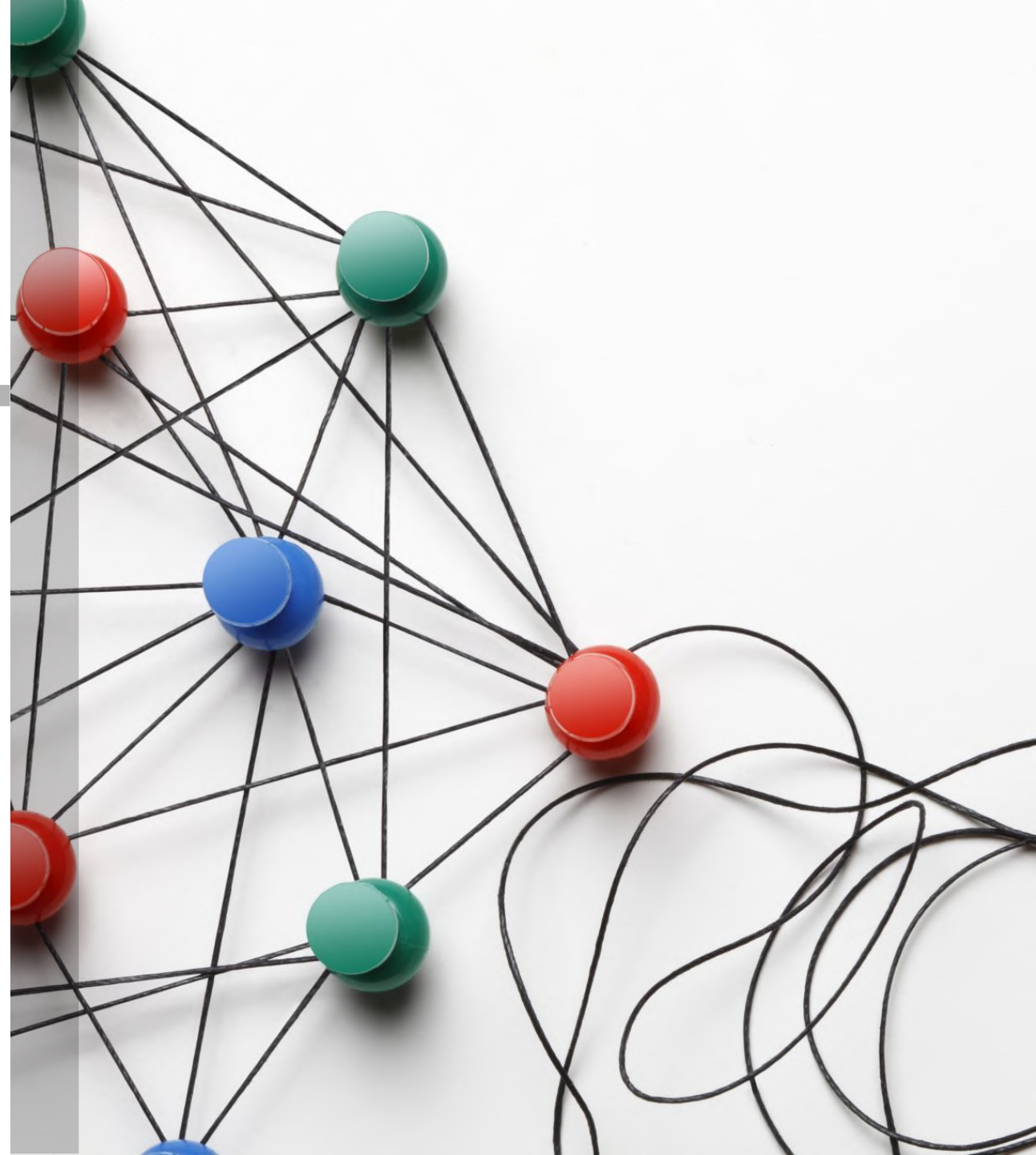
Each One Bring One- Year 2

- Each faculty lead invited a new member to join the Faculty Learning Community (now 6 members; including representation from Chemistry)
- Followed the same basic model
 - Fall: team building, delving into equity literature, exploring EBTs
 - Spring: moral support, implementing EBTs, more exploration of equity literature



Coalition of the Willing- Year 3

- FLC was intended to be one year; however, all year 2 participants asked to continue in the FLC
- Utilized Canvas for information repository; adopted *Culturally Responsive Teaching and the Brain*, Zaretta Hammond
- Leads completed Escala training



A Few FLC Thoughts

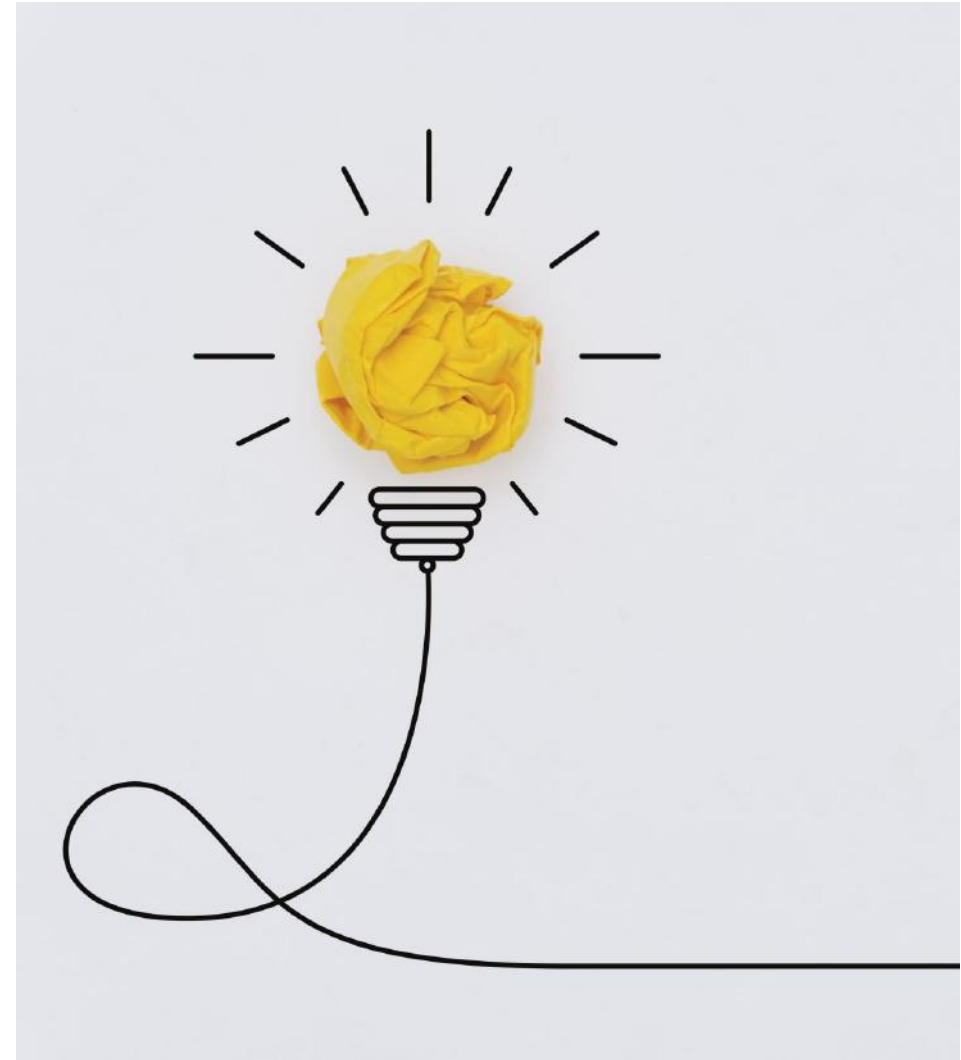
- “We did use the book and do all these discussions and stuff like that. But we actually didn't just talk about it sort of in a theoretical sense. We actually got our outcome data from our campus to actually look at the data, look at the numbers and see which specific areas we could hone in on.”
- “...before, where it's just a lot of talk which is useful, like, I said. But I think the fact that we actually did have a little bit of you know, work to do, but we could turn it into some practical action was nice.”

Big Benefits of Community

- “Having that time where we schedule those conversations or dedicate time to thinking about it and moving it forward with other folks, is extremely beneficial.”
- “It's really impossible for me to untangle what individual activities but this like commitment to carving out time to change things, I think, has been huge, and while it might be too soon to see it directly in my students, definitely, I can see it in myself.”
- “I think just the community aspect was number one.”

Brief Takeaways

- Identified motivated team leads
- Included open-minded, equity-curious faculty
- Explored “Escala” Data, equity literature
- Constrained expectations-
ONLY ONE THING
 - Often very small changes had very big impact
- Discussion time became support group
- Modeled flexibility, understanding, and creativity





Thank you!

virginia.white@rcc.edu

luis.Molina@rcc.edu



RIVERSIDE CITY COLLEGE

Increasing participation and persistence in STEM by incorporating field-based experiences in the urban environment

Dr. Andres Aguilar (Biological Sciences) aaguil67@calstatela.edu

Dr. Jennifer Garrison (Geography, Geology, and the Environment)

Dr. Yangyang Liu (Chemistry and Biochemistry)

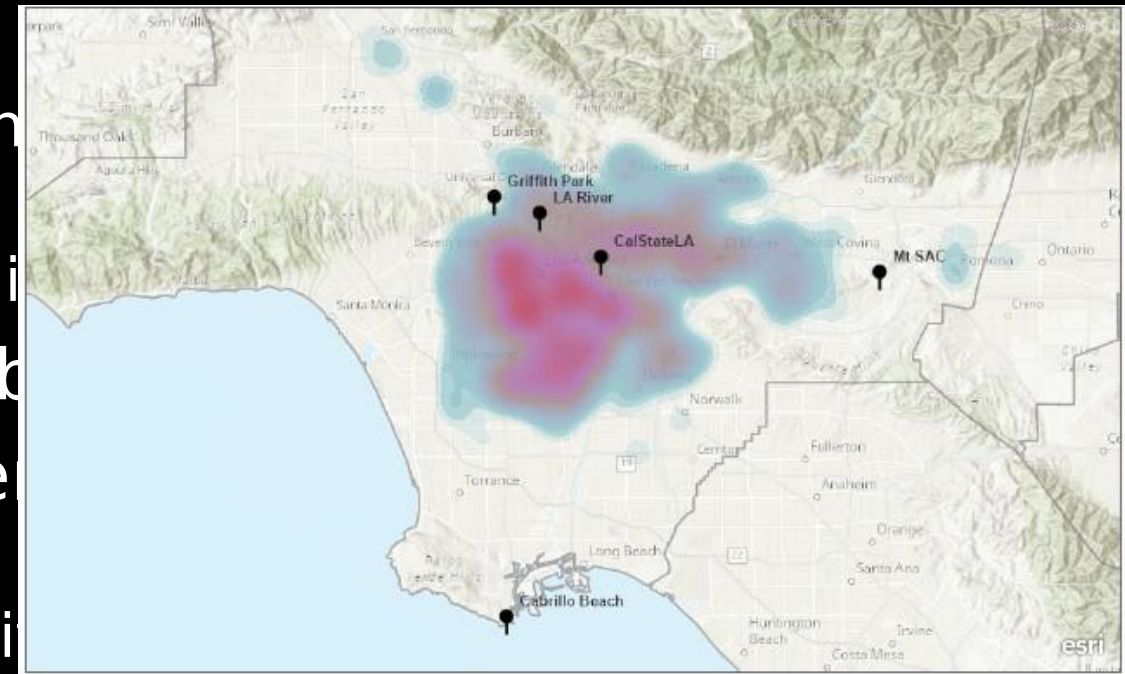
Dr. Maura Palacios (Biology - Mt. San Antonio College)

Dr. Elizabeth Torres (Biological Sciences)

Dr. René Vellanoweth (Natural and Social Sciences)

Cal State LA Setting

- Cal State LA is one of the largest MSI/HSI comprehensive universities in the country
 - ~25,000 students
 - >75% Hispanic/Latinx
 - 56% first-generation college students
 - 57% female
 - 86% of students receive financial aid
- #1 U.S. university in upward mobility
- School of Natural and Social Sciences
 - ~5,200 students
 - Demographics reflective of university



Goals of Our Program

- Increase participation in field-based disciplines at participating institutions
- Improve persistence in STEM disciplines
- Develop hands-on experiences for lower-division undergraduate courses
- Establish local 'urban' field study sites
- Minimize student-borne costs and stresses



Importance of Field-Based Disciplines

- Low representation of minoritized groups in geosciences, marine sciences, ecology and evolutionary biology
- High impact practice
 - Scientific identity
 - Self-efficacy/confidence
- Connection to contemporary societal issues
 - e.g. climate change

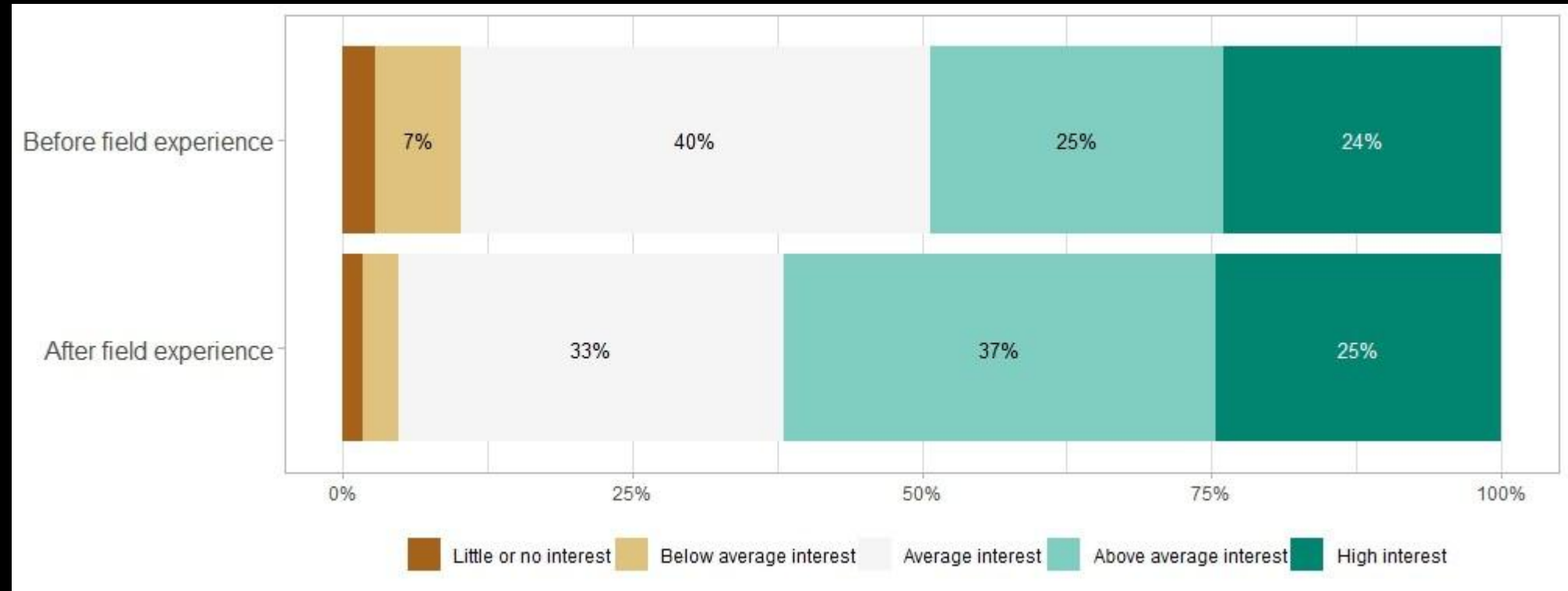


Current Lower Division Course Redevelopment

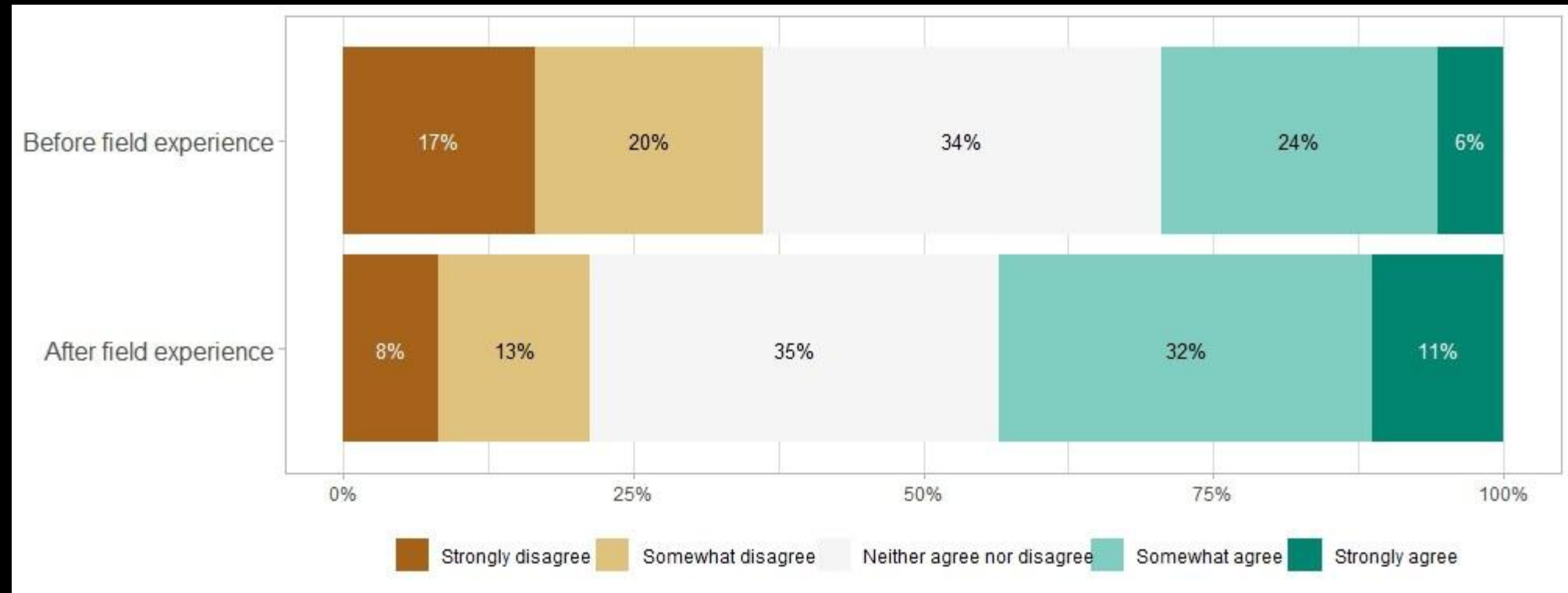
- Biology
 - Diversity of Life (CSULA)
 - General Biology / Field Biology & Ecology (Mt SAC)
- Chemistry
 - General Chemistry (CSULA)
- Geology
 - Natural Disasters (CSULA)
- Natural Sciences
 - Earth and Space Science (CSULA)

Level of interest in doing on field work

Year 1 - BIOL1200

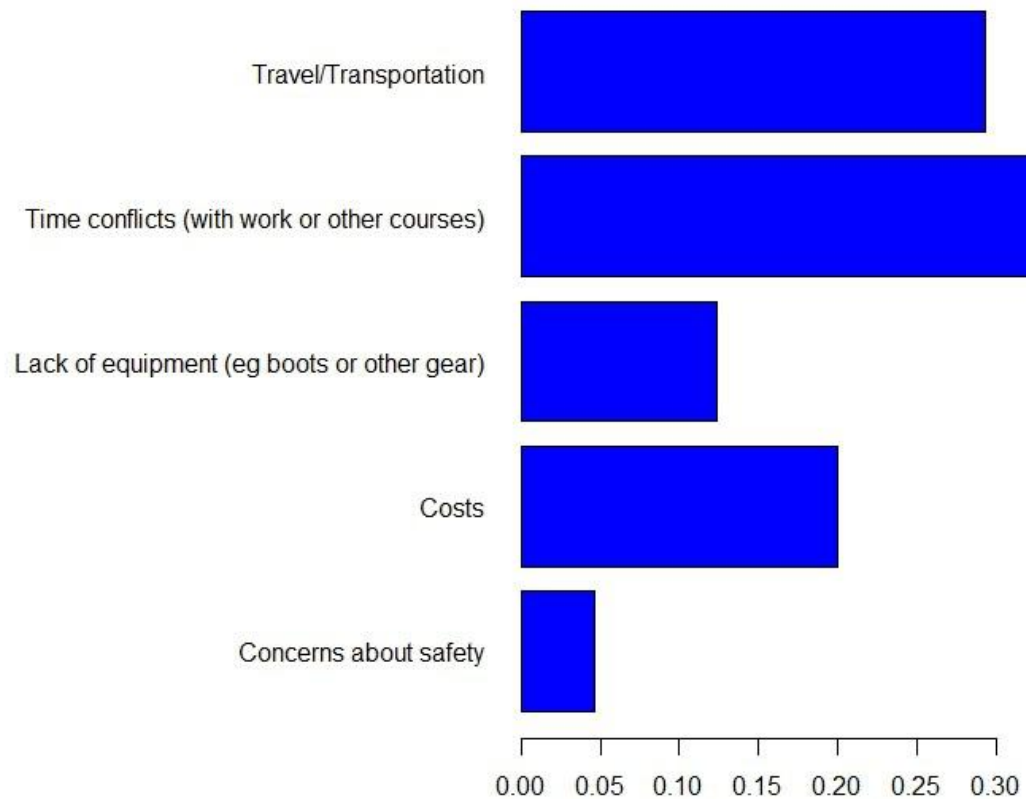


Scientific Identity of Students Year 1 - BIOL1200

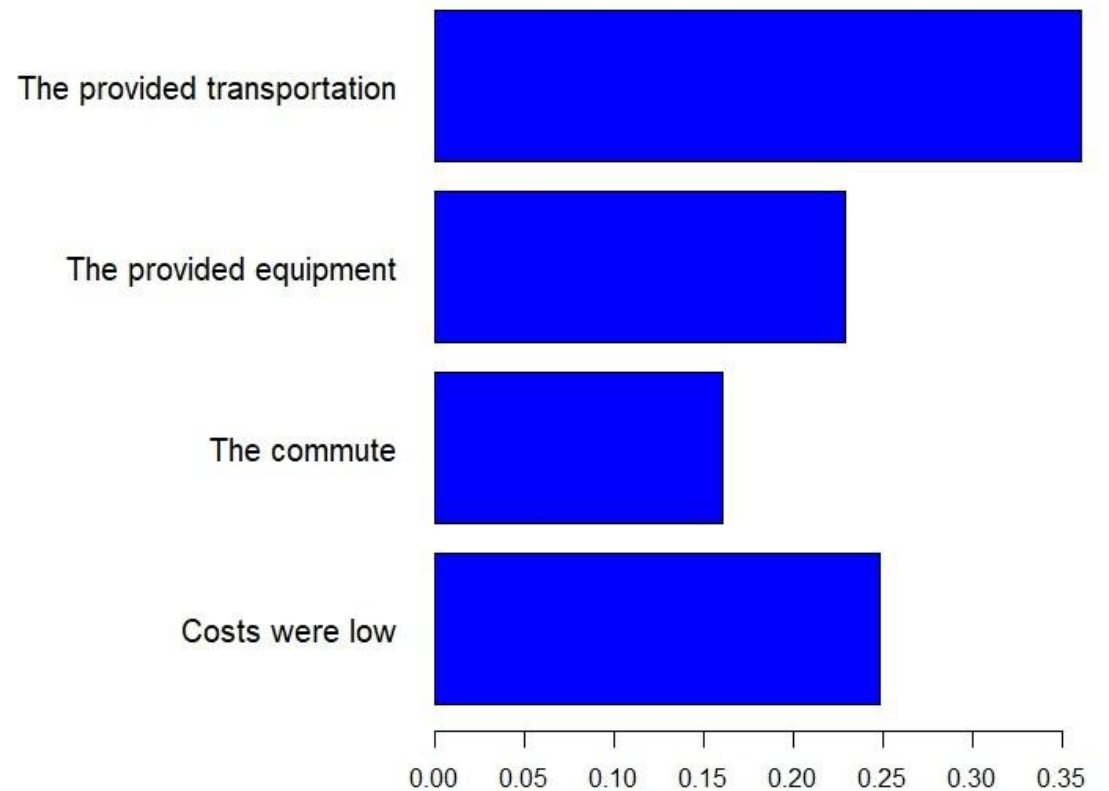


I have a strong sense of belonging to a community
of scientists

Student Concerns Prior to Attending Field Trips



What helped them attend field trips



Summary

- Course modifications are in place and running in multiple courses
- Site selection and travel taken into account
- Continued course evaluation

- Challenges
 - Continued administrative support
 - Lab instructor training



Thank you!



- Thanks to CSULA students, lab instructors, and community
- Support from NSF (#2225187)
- CSULA IRB (1925065-2)
- Dr. Pamela Leggett-Robinson
 - PLR Consulting

Recognizing Hidden Labor: Teaching-Focused Faculty as a Model for Institutional Servingness in STEM

Joseph L. Henry, PhD Candidate
University of California, Irvine

Eva Fuentes-López, PhD Student
University of California, San Diego

Natascha T. Buswell
Associate Professor of Teaching
University of California, Irvine

June 25th, 2024



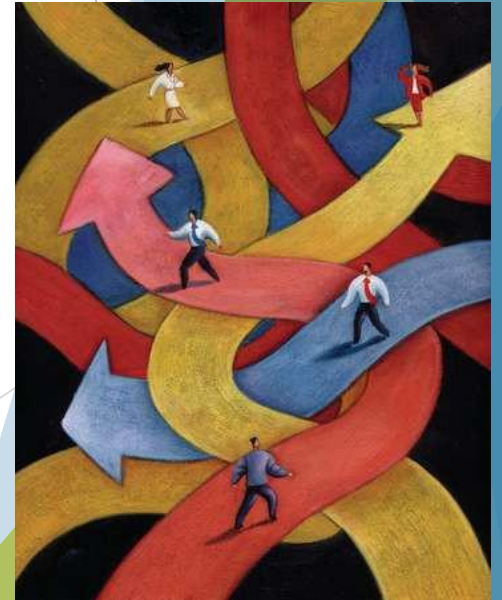
2024 NSF Regional HIS Conference on Servingness

This material is based upon work supported by the National Science Foundation under Grant No. 2040493.

An Introduction to our Project



- ▶ NSF AGEP Grant
- ▶ Focus on Teaching-Focused Faculty career trajectories and experiences
- ▶ U.S. Community colleges to R1 Institutions



Research Question & Methodology

Central Questions of interest: How is the work of STEM Latine/Hispanic TFF contributing to **serviingness** (Garcia 2023) for students who share an identity with them?

METHODOLOGY:

1. 2-hour Qualitative In-Depth Interviews
2. 19 STEM Teaching-Focused Faculty
3. Their experiences serving students, and being served (or not served) as students themselves

FINDINGS: Servingness (Garcia 2023)

Thalia on building rapport with students through speaking Spanish

Thalia is a Professor of Engineering at a Community College, who came to the US from Mexico for her undergrad and graduate studies

- ▶ (referring to communicating with students in Spanish).
- ▶ “I think it makes me, I hope, it makes me a **little less intimidating for those students that are not as comfortable with their English** and that they can sometimes get stuck with a word... and also just that they know that culturally even if I’m not speaking Spanish, they kind of feel like maybe I get them a little more.”



Thalia is a Mexican Woman and a professor of engineering at a community college

Importance of Servingness and Reciprocity

Alejandra was a first-generation college student as an undergraduate, and traveled to the US to pursue a PhD in a predominantly white university. She speaks to the power of sharing an identity with her mentors, even if they were in a different department.

- ▶ Social/Linguistic:
- ▶ “There was nobody who was Latinx in my whole entire program. But I did know about a professor who was in technology. And so, I actively looked for her...
- ▶ **She actually became one of my closest mentors** because we could just talk as we are without like, any judgmental things going on. I could use my spanglish freely, which was a big deal for me... so talking to her, and her just helping me understand that there was, **there was a place for me.**”



Alejandra Assistant
Instructional Professor at
an R1 University.

FINDINGS: Servingness (Garcia 2023)

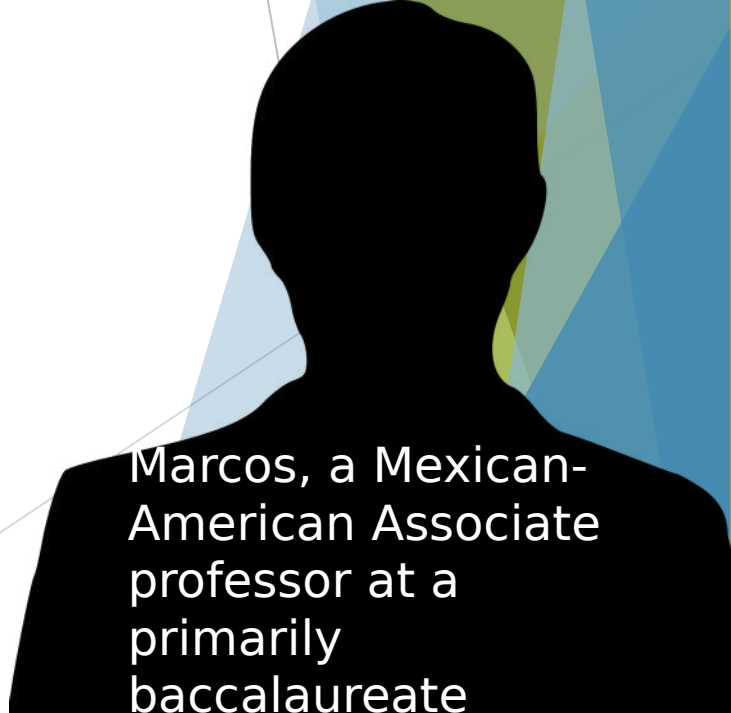
What are some other ways that TFF are supporting students

- ▶ **Using language as a resource to connect with students**
- ▶ **Providing culturally responsive mentoring to students who share an identity with them**
- ▶ **Serving as advisors to Latine student campus/national organizations**
- ▶ **Using their own funds to support student success**
- ▶ **And much more!**

Hidden Labor Associated with Minoritized Faculty

Marcos "It's always me"

- ▶ "I've always been that Hispanic dude in engineering that they need, every bit."
- ▶ "I'm the first one they reach out to. I have a hard time saying no..."
- ▶ "When it come to engineering and computer science, **it's just me.**"
- ▶ ...it is just **taxing on time.**"



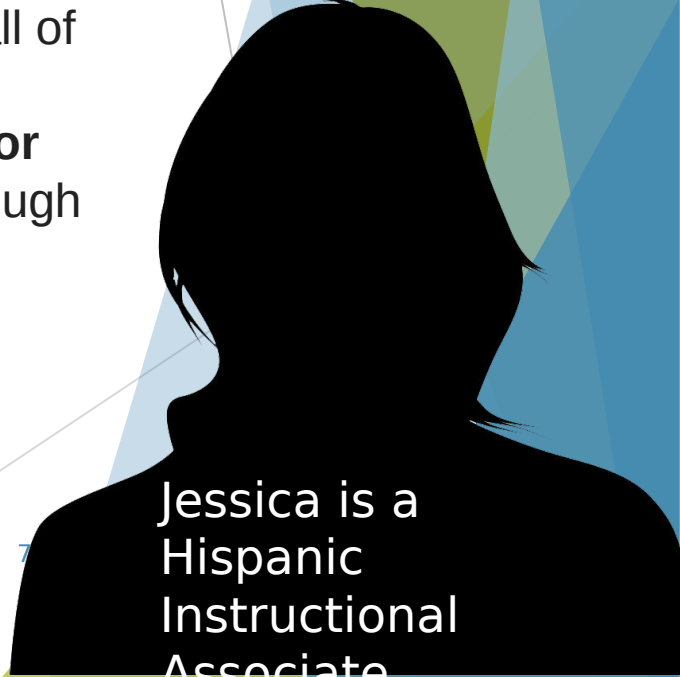
Marcos, a Mexican-American Associate professor at a primarily baccalaureate

Hidden Labor Associated with Minoritized Faculty

Jessica “I’m trying to do it all”

Jessica is an Instructional Associate Professor at an R1 university.

- ▶ “But still, what I do is still an oddity, because i’m trying to kind of do it all. **I’m trying to do teaching, service, run a program and submit research proposals.** So there is no model for that... they’re setting up new policies for evaluation.
- ▶ “**I’m never going to get credit for these programs,** they don’t show up anywhere on my evaluations...”
- ▶ “for promotion, I was advised to take all of my administrative work off of that, presumably because **it didn’t count for anything,** like nobody cared, even though that was most of my job at the time”



Jessica is a
Hispanic
Instructional
Associate

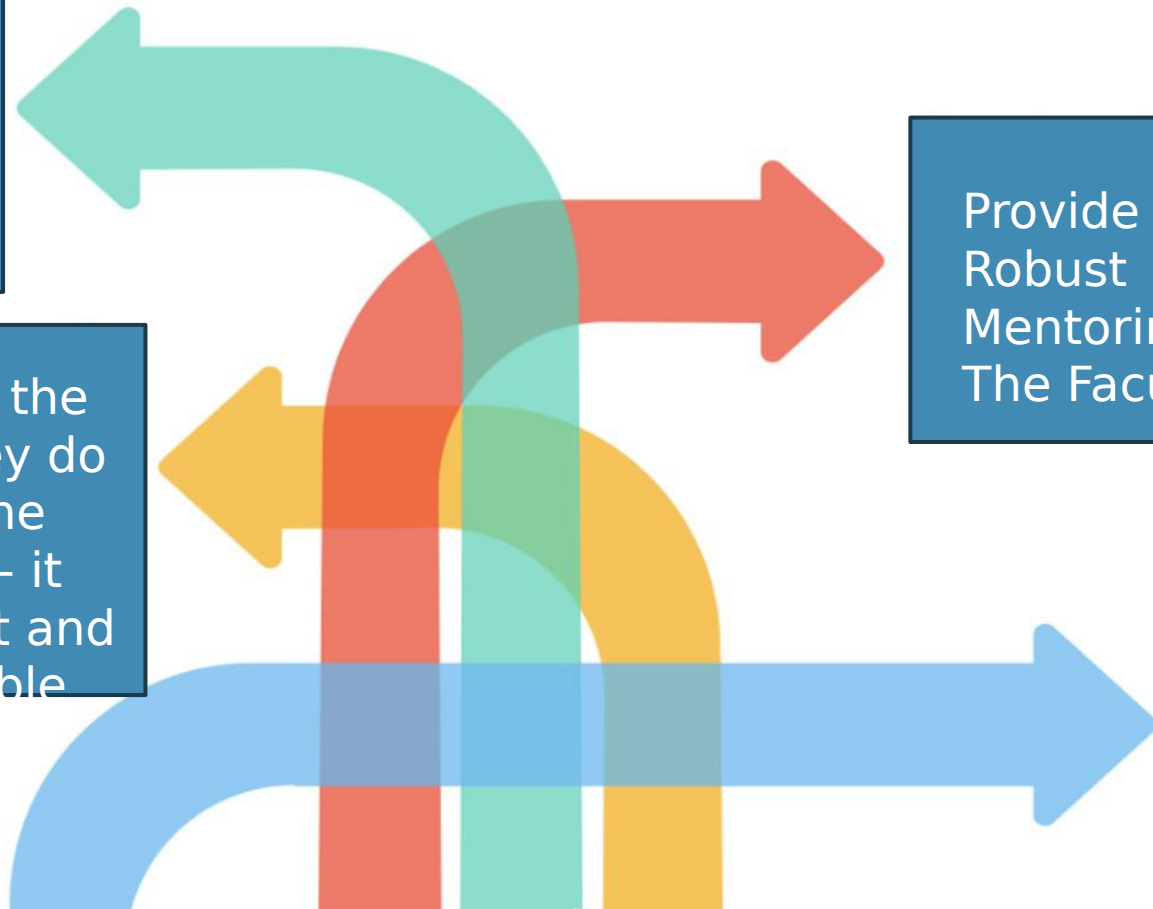
How can we make the Professor of Teaching positions more attractive to Latine future faculty?

Make cultural contributions clear in the job description and promotion documents

Reward/acknowledge the mentoring they do for the Latine community - it needs to count and not be invisible

Provide Robust Mentoring for The Faculty

Hire More Latine Faculty. To lessen the already overloaded faculty we have in these positions



Conclusion and Recruitment

Takeaway 1: Latine and Hispanic Teaching-Focused Faculty are aware of the issues of isolation and institutional failings in servingness

Takeaway 2: Institutions can support these individuals by recognizing and making visible the cultural taxation and hidden labor of these institutional actors



Josephlh@uci.edu