



**CV-RISER**

**Central Valley Region  
Interdisciplinary  
Symposium on  
EDUCATION RESEARCH**

**CENTRAL VALLEY REGION INTERDISCIPLINARY  
SYMPOSIUM ON EDUCATION RESEARCH**

Organized by:

California State University, Fresno

California State University, Stanislaus

Fresno City College

Merced Community College

University of California, Merced

**UC Merced Conference Center**

**July 22–24, 2022**

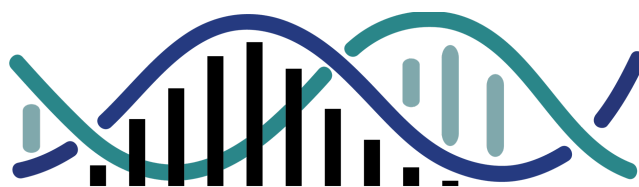
***INAUGURAL SYMPOSIUM***

## SYMPOSIUM SPONSORS



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# WELCOME TO CV-RISER!

## CV-RISER MISSION STATEMENT

CV-RISER aims to bring together researchers, educators, students, and leaders in the region's institutions to a) discuss recent education research efforts and scientific evidence, b) propose pathways to addressing voids in education research, and c) facilitate interdisciplinary conversations and inter-institutional collaborations that elevate educational research and ensure research findings are documented, disseminated, and implemented to have a positive experience on our students learning.

## CV-RISER OUTCOMES

1. The primary expected outcome of CV-RISER will be to disseminate education research findings from the Central Valley community, investigate trends in education research, and identify future directions for education research and practice.
2. The secondary expected outcome is to encourage and facilitate networking and new interdisciplinary research collaborations between faculty, staff, and students from Central Valley institutions that results in rigorous research that addresses some of our nation's most pressing education needs.
3. The third expected outcome is to provide a space for undergraduate and graduate students to discover and understand the field of educational research and potential career pathways.

## CV-RISER COVID-19 POLICIES

CV-RISER is committed to the safety of their guests at UC Merced. In accordance with [UC Merced's COVID-19 Policies and Communications](#), CV-RISER encourages guests to be updated on their vaccines and requires all guests to wear masks indoors with some exemptions:

- While speaking at the podium during a talk
- While eating or drinking
- Children under age 2
- Persons with a medical or mental health condition or developmental disability that prevents wearing a face covering

*Thank you for keeping our community safe!*

## ABOUT OUR KEYNOTE SPEAKERS



### **Dr. Alexis Patterson Williams**

Dr. Alexis Patterson Williams is joining us from the School of Education at the University of California, Davis. She is dedicated to increasing the participation of women of color in STEM fields. Her research explores the intersection of equity studies, social psychology, and science education. *More recently, she is focused on unpacking issues of equity and the role of social-emotional skills at play during student group work.*

Dr. Patterson Williams is a native Californian and received her undergraduate degree from UC Berkeley and her Master's degree from Stanford University. She received her doctorate in Curriculum Studies and Teacher Education in Science from Stanford's Graduate School of Education. Prior to graduate school, she worked in Oakland Unified School District as an Assistant Director of an after-school program, a middle school science teacher, and as an intervention instructor at an elementary school. Dr. Patterson Williams earned her Multiple Subject Teaching Credential from CSU East Bay.



### **Dr. Saúl Jiménez-Sandoval**

Dr. Saúl Jiménez-Sandoval was appointed president of Fresno State in May 2021. Jiménez-Sandoval previously served as Fresno State's provost and vice president for academic affairs, and in that role was the university's chief academic officer.

He has a long history with Fresno State, having first joined the university as a member of the faculty in 2000. Over two decades of service to the university, he has served as professor of Spanish and Portuguese, coordinator of the Spanish master of arts, chair of the Department of Modern and Classical Languages and Literatures, interim associate dean of the College of Arts and Humanities and dean of the College of Arts and Humanities.

His relation to the Central Valley is even more deeply rooted, as he moved with his family to the area to work on the family farm as a child, and as he and his wife, Mariana, decided to raise their sons in Fresno.

# THANK YOU TO CV-RISER PLANNERS

## CV-RISER PLANNING COMMITTEE

- Jackie Shay, University of California, Merced (Chair)
- Zenaida Aguilar-Muñoz, University of California, Merced
- Jourjina Alkhoury, University of California, Merced
- Sarah Bissonnette, California State University, Stanislaus
- Dermot Donnelly-Hermosillo, California State University, Fresno
- Cristine Donham, University of California, Merced
- Brittany Harding, University of California, Merced
- Aletha Harven, California State University, Stanislaus
- Petra Kranzfelder, University of California, Merced
- Don Lopez, Fresno City College
- Erik Menke, University of California, Merced
- Virginia Montero Hernandez, California State University, Stanislaus
- Brandon Tenn, Merced Community College
- Emily Walter, California State University, Fresno
- Randy Yerrick, California State University, Fresno

## CV-RISER SUBCOMMITTEES

- **Abstract Selection and Program Development**
  - Sarah Bissonnette, California State University, Stanislaus
  - Dermot Donnelly-Hermosillo, California State University, Fresno
  - Erik Menke, University of California, Merced
- **Community Building**
  - Emily Walter, California State University, Fresno
- **Keynote Speaker Selection**
  - Zenaida Aguilar-Muñoz, University of California, Merced
  - Dermot Donnelly-Hermosillo, California State University, Fresno
  - Petra Kranzfelder, University of California, Merced
  - Emily Walter, California State University, Fresno
- **Student Research Competition**
  - Sarah Bissonnette, California State University, Stanislaus
  - Petra Kranzfelder, University of California, Merced
- **Child Care**
  - Erik Menke, University of California, Merced
  - Jackie Shay, University of California, Merced
  - Danielle Waite, University of California, Merced

# PROGRAM AND SCHEDULE

**FRIDAY, JULY 22, 2022**

**CV-RISER Mixer Meet & Greet**

6:00–9:00 PM

El Capitan Hotel (in the Courtyard), 609 W Main St, Merced, CA 95340

**SATURDAY, JULY 23, 2022**

*Check-In & Breakfast (Foyer) — 7:30–9:00 AM*

*UC Merced Early Childhood Education Center Daycare (Room 225) – 7:30 AM – 8:45 PM*

*Poster Set-Up (Room 105) — 7:30–8:45 AM*

*Symposium (Main Ballroom) — 8:45 AM – 8:30 PM*

## **Opening Remarks**

8:45 AM – **Jackie Shay**, CV-RISER Committee Chair, Associate Director Center for Engaged Teaching and Learning, UC Merced

8:50 AM – **Sarah Frey**, Vice Provost and Dean of Undergraduate Education, UC Merced

8:55 AM – **Juan Sánchez Muñoz**, Chancellor, UC Merced

## **Session 1: Mapping Central Valley Student Narratives: Access, Identity, and Validation**

9:00–10:10 AM

**Session Chair: Don Lopez**, Fresno City College

1. **Alexis Atsilvsgi Zaragoza**, University of California, Berkeley — 9:00–9:20  
The Small-Town Dilemma: Understanding the Spatial Imagination of Rural California and the Implications of Physical Place in Access to Higher Education for Black, Indigenous, People of Color (BIPOC)

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2. **Joseph Carranza**, California State University, Stanislaus — 9:25–9:45  
Male Narratives in the Midst of Intersectionality: Cultural Practices for the Negotiation, Preservation, and Betterment of the Multiply Marginalized Self
3. **Keith Ellis**, Folsom Lake College — 9:50–10:10  
California's Community College Closet: LGBTQ+ Voices

*BREAK — 10:10–10:30*

### **Session 2: Frameworks for Assessing and Responding to Student Expectations and Needs**

10:30–11:40 AM

**Session Chair: Dermot Donnelly-Hermosillo**, California State University, Fresno

4. **Adrianna Signorini**, University of California, Merced — 10:30–10:50  
SATAL's Classroom assessment and educational development integrated together
5. **Antoinette (Toni) Stone**, University of California, Merced — 10:55–11:15  
Student Epistemologies in the Age of the Pandemic
6. **Adrienne Seegers**, Columbia College — 11:20–11:40  
Brain-Targeted Teaching: A Tool for College Faculty?

*LUNCH — 11:45–1:15*

### **Session 3: Inquiry-Based Teaching and Learning in STEM**

1:15–2:25 PM

**Session Chair: Sarah Bissonnette**, California State University, Stanislaus

7. **Emily Walter**, California State University, Fresno — 1:15–1:35  
Questioning for Relevance: Exploring Student Outcomes from Creative Assessment "Quests" in a General Education Biology Course
8. **Marcos García-Ojeda**, University of California, Merced — 1:40–2:00  
Understand how mutation, selection and genetic drift promote genetic variation in a bacterial population
9. **Dermot Donnelly-Hermosillo**, California State University, Fresno — 2:05–2:25  
Development and Implementation of a Guided-Inquiry Laboratory Structure for an Introductory Chemistry Course

*PHOTO BREAK — 2:25–2:45*



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### **Session 4: Breaking Barriers: Transformative Practices that Empower Students**

2:45–3:55 PM

**Session Chair: Erik Menke**, University of California, Merced

10. **Sarah Bissonnette**, California State University, Stanislaus — 2:45–3:05  
CIENCIA at Stan State: fostering inclusive teaching through reflection, self-actualization, and cultural change among STEM faculty
11. **Virginia Montero Hernandez**, California State University, Stanislaus— 3:10–3:30  
Development of strategies to promote student empowerment
12. **Carlos Perez**, Fresno City College — 3:35–3:55  
Disrupting SLOs with DEI and Paradigm Shifts

### **Session 5: Poster Session**

4:30–6:00 PM

**UC Merced Conference Center Room 105**

*BANQUET DINNER AND KEYNOTE — 6:00–8:00 PM*

### **Keynote Speaker: Alexis Patterson Williams**

7:00–8:00 PM

**Introduced by Zenaida Aguirre-Muñoz**, University of California, Merced

**Alexis Patterson Williams**, University of California, Davis

Sustaining Disciplinary Literacy in Science: A Transformative, Just Model for Teaching the Language of Science

### **Student Awards and Closing Remarks**

**Petra Kranzfelder**, University of California, Merced

**Don Lopez**, Fresno City College

8:00–8:30 PM

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# SUNDAY, JULY 24, 2022

*Breakfast (Foyer) — 8:00–9:00 AM*

*UC Merced Early Childhood Education Center Daycare (Room 225) – 8:00 AM – 2:15 PM*

## **Keynote Speaker: Saúl Jiménez-Sandoval**

9:00–10:00 AM

**Introduced by Emily Walter, California State University, Fresno**

**Saúl Jiménez-Sandoval, California State University, Fresno**

Energizing Education Research in the Central Valley

## **Breakout Sessions and Working Groups**

10:00 AM–11:30 PM

- **Introduction to education research (Room 205):** *Facilitated by Jackie Shay*  
This workshop is designed for faculty and educators. In this workshop, explore ways to begin collecting, interpreting, and learning from classroom data to improve your teaching.
- **Research meetings and discussion (Room 110):** *Facilitated by Petra Kranzfelder*  
Part of the goal of this meeting is to help facilitate current and new education research projects across campuses and disciplines in the Central Valley. In this window, research groups will have a chance to meet with their teams or establish new research groups.
- **Student Session: Exploring the education research life (Room 210):**  
*Facilitated by Brittany Harding*  
In this student open forum, education research students answer questions about a career in this field and how to prepare for it!

11:30–1:00 PM

- **Applications for culturally responsive teaching (Room 210):** *Facilitated by Virginia Montero Hernandez and Sarah Bissonnette*  
In this discussion, educators introduce best practices for culturally responsive teaching, share their experience applying these practices, and engage in deeper conversations about next steps.
- **Taking action on your campus (Room 110):** *Facilitated by Don Lopez*  
For those not in research groups, what can you do to be a change agent on your campus and help encourage education research initiatives. In this brainstorm session, campus groups will team up to identify areas for improvement and tasks to take to make change.

*LUNCH AND GOODBYES — 1:00–2:00 PM*

# ABSTRACTS

*Talk abstracts are in chronological order*

*Poster abstracts are listed in the order of their poster number*

*See list of acronyms on page 24*

1. **ZARAGOZA, ALEXIS ATSILVSGI**

**The Small-Town Dilemma: Understanding the Spatial Imagination of Rural California and the Implications of Physical Place in Access to Higher Education for Black, Indigenous, People of Color (BIPOC).**

Popular perceptions of rural California as “conservative, old-fashioned, and overwhelmingly white” excludes diverse populations and systemic couplings of power embedded in the state, especially the California Central Valley. Between the prison system on the CA-99 feeding into dual ends of gentrification from the Bay Area and I-5 as a center of supply chain logistics and an economic takeover of minority small towns, the economic landscape of the Central Valley is changing. Black, Indigenous, and Students of Color in the Central Valley are facing a proximity problem: college is far away and money is necessary, the prison system alongside corporations like Amazon is closer and pays off faster than college campuses. While the influx of industry creates an illusion of choice, it is limiting the perceived landscapes of hope for young people. In my research, I am utilizing geo-computation to explore relationships within the spatial imaginaries of Black, Indigenous, and People of Color (BIPOC) in the Central Valley of California as it relates to spatial constrictions illuminating geographic barriers to college access and in turn, upward mobility. I also turn to literary theory for an understanding of feelings of loss and disconnection from land caused by the influx of techno-capitalism. My research involves mapping peripheral distance to centers of hope, maps of exits and movements from the Bay Area, understanding the Central North Valley as the Bay’s newest edge-city, and the effect of the lack of higher education institutions on the formation of identity will piece together the landscape of hope (or lack thereof) within the heartland of the state. Finally, I am interested in understanding the landscape of hope through a lens of empowering rural people of color and infusing hope and positive opportunity into communities of color.

2. **CARRANZA, JOSEPH**

**Male Narratives in the Midst of Intersectionality: Cultural Practices for the Negotiation, Preservation, and Betterment of the Multiply Marginalized Self**

This study employed a narrative methodology to increase an understanding of how Mexican American males utilized their agency as they constructed their identities while negotiating competing hegemonic discourses in multiple socio-cultural contexts. The study used the theoretical lens of cultural production to honor the personal journeys of six Mexican American males as they negotiated the space between agency and structure. Findings describe how each of these men exhibited their intersectionality and multiple positionalities as they responded to the distinct expectations of hegemonic

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masculinities in both the Anglo American and Mexican American cultures. Participants' narratives highlighted the role and influences of distinct and competing communities of practice that reflected different hegemonic discourses of masculinity on equally distinct and fluid gendered performances. As bi-cultural socio-cultural agents, participants moderated their gendered performances and exhibited strategic plasticity in response to competing hegemonies as they navigated multiple levels of marginalization.

### 3. ELLIS, KEITH

#### **California's Community College Closet: LGBTQ+ Voices**

LGBTQ+ individuals face numerous challenges while attending college, including bullying and harassment, a curriculum that does not reflect their identity, and faculty or peers who do not use their correct pronouns or preferred names. Furthermore, LGBTQ+ students often face significant marginalization that leads to some of the highest suicide rates among any student population (Trevor Project, 2020; di Giacomo et al., 2018). This study is framed according to Vincent Tinto's 1975 Model of Student Integration and 1993 Interactionist Theory of College Student Departure infused with Rendon's (1994) Validation Theory to explore more fully why these students persist and succeed given the experiences related to their identities. The 7 participants in this study are a diverse group with many facets in their student identity including: gender, sexual orientation, race/ethnicity/culture, and experiences associated with their identity. From this study, 5 themes emerged: 1) Importance of Faculty Interactions and Support; 2) Importance of Student Services; 3) Sense of Safety—Policing and Restrooms; 4) Validation by Using Proper Pronouns and Preferred Names, and 5) Supporting Trans Outness. The importance of faculty interactions was explored along the outness continuum. At the core of many of these students' community college experiences was the concept of validation and a sense of belonging. Validating experiences contributed to a campus climate where the students felt safe and accepted to be open about their LGBTQ+ identity. LGBTQ+ California Community College students experience college differently from their non-LGBTQ+ or heterosexual and gender conforming peers attributable in some part to the heteronormativity that permeates our society.

### 4. SIGNORINI, ADRIANA

#### **SATAL's Classroom assessment and educational development integrated together**

The purpose of this presentation is to share SATAL's classroom assessment tools and the rich information instructors can derive from their implementation to respond to students' needs and for their own professional development. The SATAL program, a UCM campus assessment support involving undergraduates will share Classroom Observation Protocol for Undergraduate STEM (COPUS) results paired with mid-semester feedback findings as a fruitful mechanism to document active learning practices together with the student perspective on their learning to respond to the students' immediate needs. The SATAL staff will present sample reports, action taken, and impact on the student population as a responsive approach to teaching and learning. Also, we will address how the presented assessment practices can be utilized for different purposes such as classroom assessment, research, and tenure and promotion.

### 5. **STONE, ATOINETTE**

#### **Student Epistemologies in the Age of the Pandemic**

Student epistemologies are expectations, attitudes, and beliefs that students hold about what is necessary to be successful in their study of science. These epistemologies can play a critical role in how students respond to the course and how they process information to construct their knowledge. They can influence what classroom activities and skills students think are important; what information they think is useful and what information they think is irrelevant. Often these epistemologies differ dramatically from “expert” epistemologies, or what instructors expect students to do. The MPEX, a survey instrument that measures student views at the beginning and end of a first semester physics class can help determine how student epistemologies may change as a result of a particular pedagogical approach. This survey was given at the beginning and end of the fall and spring semesters of 2020 and 2021, during the pandemic, when instruction was remote. The same survey was given in the fall and spring semesters of 2021 and 2022, when in-person instruction resumed. The results of the surveys which examine epistemological shifts for these cohorts that may have resulted from the varying pedagogies, employed by necessity due to the pandemic, is the focus of this paper.

### 6. **SEEGERS, ADRIENNE**

#### **Brain-Targeted Teaching: A Tool for College Faculty?**

Although Mind Brain and Education Science (MBES) offers robust research informed practices for educators there is limited awareness and integration of MBES principles in community college teaching. Brain-Targeted Teaching (BTT) is a framework designed by Dr. Mariale Hardiman to help teachers implement neuroscience and related fields in their work. This qualitative study examined community college faculty’s perception of BTT as a tool to support implementation of MBES in their teaching. Participants engaged in a professional development experience that explored and modeled BTT and reported. The study found that participants made immediate change and planned to make change to their teaching as a result of their experience and perceived BTT to be a valuable tool. In this interactive session we’ll learn more about the BTT framework and examine the findings of this study.

### 7. **WALTER, EMILY**

#### **Questioning for Relevance: Exploring Student Outcomes from Creative Assessment "Quests" in a General Education Biology Course**

Creativity, critical thinking, questioning, problem solving, and collaboration skills are critical 21st century skills. Contrary to these goals, students often perceive STEM as boring, lacking relevance, and full of memorizing facts. Students in turn leave STEM degrees or never select them to begin with. It is on these premises that we assert that

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assessments in STEM need to reflect real-world tasks and engage students' interests and skills.

In this study, we used a mixed methods approach to explore participant outcomes after they completed creative assignments in a general biology course in Spring and Fall 2021. In this course, students choose to do three assignment "quests" from a list of over 20 options. The pedagogical goal of the quests was to use science in everyday life, explore and find value in nature, and/or share science with others. The quests differ from traditional assignments, as the product was often something other than a paper, poster, or presentation and because students were encouraged to use creativity and personal talents in their work.

Another key aspect of the quests was that we used gamification principles to encourage students. Students could theme assignments to earn "skill trees," or do them in special ways to earn "badges." For example, students were encouraged to do the projects with friends and family or create the project in English and another language. Example student products included poetry, songs, museum tours on Animal Crossing, a movie with a time traveling dog, and fossil layer cakes.

We did a mixed method analysis of project reflections (N=924) and interviews (n=11) to uncover how and in what ways the quests elicited participant creativity and general emotions. Our talk will discuss results from this research and implications for how others can use creative and quest-style assignments in their own teaching.

### 8. GARCÍA-OJEDA, MARCOS

#### **Understand how mutation, selection and genetic drift promote genetic variation in a bacterial population**

The evolutionary principles driving genetic variation are challenging for students to understand. Here, we describe a lesson created to teach how mutation, natural selection and genetic drift promote genetic variation in a hypothetical population of *E. coli*. Using the antibiotic resistance crisis as a foundation for the lesson, students i) describe how mutation, selection, and genetic drift affect the degree of genetic variation in a population, ii) refute the idea that selection leads to mutation, and iii) create a model using genetic drift as the mechanism for changing genetic variation over generations in a population. Evaluating data from 6 semesters in an upper-division microbiology course, we see a statistically significant reduction ( $X^2(3,1079) = 141.5, p < 0.00001$ ) in the percentage of students who state that "Talking an antibiotic causes mutations that lead to antibiotic resistance." Furthermore, students report an increase in their understanding of the process of genetic drift post activity. This activity is modifiable to any lower- and upper-division biology courses

### 9. DONNELLY-HERMOSILLO, DERMOT; PERSON, ERIC

#### **Development and Implementation of a Guided-Inquiry Laboratory Structure for an Introductory Chemistry Course**

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Laboratory courses are often critiqued for being fragmented from week-to-week, having little application to everyday life, and failing to reflect authentic science practices. This presentation will detail the development a guided-inquiry laboratory structure for an Introductory Chemistry course involving a zoo narrative. The guided inquiry structure was compared with a conventional 'cookbook' laboratory structure for two semesters based on conceptual and motivational measures (n = 662). Findings illustrate similar student conceptual gains for both structures, but the two conditions varied by motivational factors influencing students. This presentation considers the implications of these findings for undergraduate laboratory science courses.

### 10. **BISSONETTE, SARAH; COVER, MATTHEW**

#### **CIENCIA at Stan State: fostering inclusive teaching through reflection, self-actualization, and cultural change among STEM faculty**

The Collaboration for Inclusive and Engaging Curriculum, Instruction, and Achievement (CIENCIA) is a professional learning program for STEM faculty at Stanislaus State funded through an NSF HSI grant (#1832558). The overall goal of CIENCIA is to improve student retention, graduation, and success by improving teaching and learning in gateway courses. Our theory of change assumes that the greatest barriers to student success are deeply embedded in the culture of STEM education, and cannot be solved with simple fixes or one-day workshops. Gatekeeping, competition, objectivity, and high-stakes assessments of factual information are dominant paradigms within STEM. We aim to transform the culture away from these privileged agreements towards one that emphasizes care, collaboration, inclusion, culturally-responsive teaching, and deep, contextualized learning. From 2019-2022, CIENCIA has supported three cohorts of 7-15 participants in year-long faculty learning programs that emphasize reflection, self-actualization, and cultural change. We have found that extended, meaningful experiences are needed to foster changes in faculty identity, changes in teaching practices, and shifts in professional culture. Among many participants, there was growing awareness of the relevance of social identities to their teaching, and serious grappling with some of the dominant paradigms listed above. Additionally, challenges related to the pandemic and remote teaching greatly influenced participant understandings of their role as educators. Many participants reported increased agency to reimagine the learning environment, and a newfound sense of community with other like-minded educators. Even so, we find that there remain strong structural barriers to cultural change. High teaching loads, lack of recognition and reward for pedagogical change, extended acculturation in STEM, and broader societal forces of inequity all worked to limit faculty engagement and culture change. A commitment to inclusive teaching will require transformative changes in faculty identity and institutional priorities, and necessitates challenging many of the cultural norms of STEM and academia.

### 11. **MONTERO HERNANDEZ, VIRGINIA**

#### **Development of strategies to promote student empowerment**

I will discuss different teaching, research, and mentoring strategies that I have implemented during the last four years to promote student empowerment. In particular, I

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will analyze three specific interventions that aimed to help students to activate their personal power and voice in the college context and outside. I will discuss the theoretical foundations behind the design of those interventions, their implementation, and outcomes.

### 12. PEREZ, CARLOS

#### **Disrupting SLOs with DEI and Paradigm Shifts**

Student Learning Outcomes (SLOs) are paramount for the enhancement of student success. SLOs assessment give the needed feedback to improve the teaching-learning framework. With that in mind, there are some initiatives pushing for a change in the educational model through SLOs with the objective to close equity gaps among traditionally underrepresented groups. This session will introduce a novel multidimensional DEI student-success framework.

### 13. ALMEIDA, MELISSA

#### **COVID-19 Imposed Digital Learning Environment: The Relationship Between Perceived Educator Attitude and Student Acceptance**

Past research makes frequent note of educator and faculty resistance or concerns regarding online education platforms. However, because of the pandemic, both educators who champion new learning technologies and those with concerns about the efficacy and value of online learning were suddenly teaching remotely. This provided an opportunity to ask if students' perceptions of educator attitudes toward digital learning environments influence the student's acceptance of these platforms. This question was addressed via a quantitative correlational survey design to measure the strength of association between educator attitude and student acceptance as a mean across the scale measuring confidence in the platform effectiveness as implemented in two specific instances - their best and worst mandatory online-course experiences. This score was used to compare to the Test of e-Learning Related Attitudes (TeLRA) scale to measure teacher attitudes towards e-learning. The Pearson's correlation coefficients were computed for the analysis of a total of 205-course evaluations. Considering all evaluations there was a strong positive correlation in the relationship between student acceptance and perceived educator attitude. There were no statistically significant correlations between acceptance, previous online course experience, or age. This suggests that students who report a positive perception of the educator's attitude will also report more positive acceptance levels relating to software platform choices and course design.

### 14. FUGERE, TAYLOR

#### **Bumping into each other online – The gradual process of building meaningful connections in online contexts for underrepresented groups in STEM**

Building meaningful connections in online contexts became a necessity in 2020 when the covid-19 pandemic forced people to rely on virtual means for their interactions. As



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Zoom Meetings became the common method of participating in work and school, institutions scrambled to create an enriching and meaningful environment for their members. This transition has been challenging, and work organizations have reported increased conflict and 'zoom-fatigue' whereas educational institutions have experienced increased disconnectedness and attrition (e.g. Leal Filho 2021 et al; Galanti et al. 2021). In this study, we ask: How can individuals form meaningful connections in the context of fully remote professional environments? In particular, we focus on the processes with which gradual familiarity is created in online contexts. In the physical domain, we take the gradual nature of friendship building for granted; people run into one another in the midst of their daily activities and through repeated opportune encounters they begin to form deeper ties. This is challenging in online environments, where interactions are predominantly intentional and designed. There are few opportunities for people to "bump into each other" and engage in casual conversations in passing. While the importance of making meaningful connections in professional contexts has been effectively linked to several positive outcomes, such as motivation, learning, innovation, sense of belonging and professional identity formation. We examine these processes in the context of first-year STEM (Science, Technology, Engineering, and Math) students within their first and entirely remote year of instruction on a university campus. We examine the mechanisms that enabled students to feel connected to other students, supported by the university, and experience an overall sense of belonging while coping with an unprecedented time in higher education.

### 15. HONG, HANBO

#### **Student-Centered Learning Characteristic and Perception During Emergency Remote Teaching in a Minority-Serving Institution**

Due to the COVID-19 pandemic, many universities moved to emergency remote teaching (ERT). This allowed institutions to continue their instruction despite not being in person, yet inevitably created subsequent impact impeding the student learning. Instructors in UC Merced as a research-intensive and minority-serving institution (MSI) have adopted various pedagogical changes compared with in-person instructions to adapt the ERT. We conducted interviews after ERT to collect such data and anticipated an interesting trend of them becoming more student-centered throughout the period. We aim to analyze the data to study and prove the existence and extent of such perception about the more emerging student-centered learning (SCL) characteristic.

We conducted qualitative inductive coding on the interview transcripts then adopted a theoretical framework to build the codes into the constructs. From the constructs, we are able to formulate and quantify the extent of the SCL characteristic of instructors' teaching and discourse practices, the extent of them describing their teaching practices as SCL, and the extent of them enact SCL and its alignment with their enacted practices. The construction and analysis shed light on the SCL pedagogy developments in STEM discipline.

### 16. RAMOS, LORRAINE

#### **Diverse STEM Voices, the Role of Conceptual Metaphors in Introductory Biology**

### Courses

To retain diverse students in STEM fields, we need to engage interests and motivations in introductory science courses (Tanner, 2013; Dewsbury and Brame, 2019). For diverse students, the strongest motivators to pursue STEM degrees are tied to prosocial values and cultural connections to their families (Jackson et al., 2016). A strategy called “values affirmation” can harness these motivators and support students who may experience negative stereotypes in academic settings (Jordt et al, 2017); however, the reasoning process and what students have to say about learning in these affirmations has not had a systematic framework for teaching and learning purposes. To that end, this study is interested in why metaphor matters and how Biology classrooms could be transformed by engaging student voices. We employed this value affirmation exercise in three introductory Biology classes as an intervention to obtain a better understanding of student’s self-efficacy and attitudes to help reduce the achievement gap within STEM students. The participants in this project were students enrolled in a medium-sized rural public university in the western U.S. which enrolls about 10,000 students. This study surveys a corpus of students’ work for conceptual metaphors to illustrate how learning experiences and values have been internalized and shared. We found that metaphoric analysis offers critical knowledge about cognitive and affective experiences, with various teaching and learning applications. We found that conceptual metaphors are rich and structured frameworks to gain perspective on motivations and self-efficacy factors. Underrepresented groups have emotionally charged experiences related to science and understanding how these experiences are conceptualized can inform future pedagogy. The use of figurative language and metaphors provides insights into student social and psychological support systems, student values and student logic in an introductory science setting. Overall, our study reveals that conceptual metaphors are rich expressions of values and aspirations.

#### 17. KAHLERT, SHIRLEY

##### **"Academic Language is No One's Mother Tongue": Teaching to the Audience Before Us**

Understanding the role of language communities is essential to any liberatory pedagogy as students learn to present their professional selves. As they enter college, students must make a difficult and necessary shift from the language of the community to the language of the academy. Therefore, to support authentic learning, effective pedagogies must consider their emotional as well as academic issues. They must recognize the value of the students' "mother tongue" and offer academic and emotional support based on learning theory.

#### 18. SARAFIAN, KAREN

##### **What's Next? Action Research for Continuous Program Improvement and Positive Social Emotional Outcomes**

Today's elementary school students face myriad traumatic issues including poverty, violence, physical and emotional abuse, homelessness, and parental substance abuse.

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These adverse childhood experiences are responsible for an increased risk of academic failure and behavioral problems in childhood, adolescence, and into adulthood. Social-emotional learning (SEL) programs, provided through school and community partnerships, attempt to address these needs in both school-based and out-of-school-time (OST) learning settings. The purpose of this action research study was to examine one northern California-based nonprofit organization's OST SEL program for elementary students and determine actions and interventions for greater program effectiveness.

Students, parent/guardians, site administrators, school-staff, and community members engaged in focus groups, completed surveys, participated in validation groups, and acted as research associates throughout the iterative plan, act, observe, reflect cycle. Qualitative data included identified themes from authenticated and coded transcripts while quantitative data included descriptive statistical analysis of participant surveys.

Based on themes and data trends, as well as the application of self-determination theory's basic psychological needs satisfaction mini-theory, findings demonstrate that student self-management skills improved during the 4-week action research cycle, as did their sense of autonomy, competence, and relatedness. Findings also suggest growth opportunities in the areas of responsible decision-making and program improvement through development and implementation of integrated and universal SEL supports in classrooms, schools, families, and the larger community.

Recommendations for future action research cycles include age and developmental considerations regarding instruction and application of responsible decision-making skills, and integration of all five SEL competencies. There is also a call for implementation of partnerships between schools, families, and community organizations for resource coordination. By focusing on continuous improvement through an ongoing action research process, this study advances the work of the northern California-based nonprofit organization and its programs and offers a model for other organizations seeking positive youth outcomes.

### 19. TROY, KRIS

#### **Morning, midday, or night: Learning time-of-day affects student experience– but not performance– in an upper division genetics course**

Research on K-12th grade students shows reduced performance in classes scheduled early in the morning if the student prefers to learn and work later in the day. Not much research has been done on undergraduate learners in the morning, nor research at either level on learning in the late evening-- like the Spring 2022 UC Merced Genetics course where some sections were scheduled to end as late as 9:20 pm. To understand the experiences and affects on performance for students in these courses, we compiled 143 survey responses querying student time-of-day learning preference, including free response questions about student experience at different times of day and with different course modalities (in-person vs remote instruction), from the 167-student Genetics course. We found that although students do have different time-of-day learning preferences, their overall exam grades were not affected by whether these preferences

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aligned with scheduled class time. However, asking open ended questions about the experiences that come with late evening classes elucidated important health, safety, and equity concerns that would be missed by looking at student performance alone. For example, students shared concerns about not having time to eat before the dining hall closes, being expected to wait on campus for several hours for their scheduled class time, being worried about late-night transportation accessibility, and with fear of being assaulted walking home past sunset. Additionally, students expressed that changing the course modality can offset some of the downsides of learning late at night, and students were significantly more likely to prefer sections in the early morning or late night if the courses were instructed remotely. Taken together, the responses indicate that these quality-of-life concerns might not be visible in their grade performance, but still represent an area in need of consideration and improvement for the sake of student's well-being.

### 20. YORK, ANA

#### **The Efficacy of CALM Application for Improving High School Students' Subjective Wellbeing**

The purpose of this quasi-experimental, single-group, pretest-posttest study is to share the difference that existed in the subjective wellbeing of high school students before and after listening to a guided mindfulness meditation from an online application. The theoretical foundation was positive psychology and the PERMA model. The sample consisted of 83 students (67 females, 15 males, one unidentified). Students participated via ZOOM and completed the EPOCH Measure on days one and five. A repeated measures MANOVA was used to address the research question. The overall MANOVA was statistically significant, Roy's Largest Root = 1.07,  $F(5, 78) = 16.64$ ,  $p < .001$ , partial  $\eta^2 = .52$ . Therefore, a series of repeated measures ANOVAs were conducted to examine each dimension of the EPOCH Measure of Adolescent Wellbeing (engagement, perseverance, optimism, connectedness, and happiness). There was a significant difference in each dimension, so the null hypothesis was rejected.

### 21. GONZALEZ MILLAN, NAHUI

#### **Power of Guidance: Mentorship Need and Viability for Undocumented Student Populations**

There are more than two million undocumented individuals living within the state of California (Hayes & Hill, 2017). When attempting to transition to higher education, many undocumented students encounter barriers that inhibit their passage. Undocumented young adults between the ages of 18-24 attend higher education at lower rates than their documented peers (Passel & Cohn, 2008). In order to evaluate the educational resources available to undocumented high school students and their impact on their access to higher education, 3 undocumented college students were interviewed by undocumented college researchers. Interviews lasted between 40 minutes - 60 minutes and were recorded via Zoom. To protect the anonymity and confidentiality of the participants, pseudonyms were used. Questions were about the resources available to them as undocumented students. What we found was that all participants mentioned that having a supportive figure such as a mentor/counselor, was imperative in their

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transition to higher education. As a result of these findings, the researchers began development of the Rooted in Education Mentorship, a mentorship for undocumented youth from undocumented college students and are conducting further research on the resources available to undocumented high school students

### 22. HARDING, BRITTANY

#### **Metacognitive Strategies for Gateway STEM Courses**

Metacognition refers to the awareness of one's own thinking processes. The benefits of metacognition on student performance are well documented and a recent study suggests that the infusion of metacognitive instruction with active learning in General Chemistry has a significant effect on student performance. General Chemistry is required as a prerequisite for STEM majors at UCM and poor performance in these gateway courses is one reason students leave STEM programs. Accurate and efficient metacognitive monitoring is critical to performance because it encourages people to reflect on their abilities relative to the demands of a task. Thus, implementing effective metacognitive strategies in gateway courses at UCM may enhance student performance and increase the retention of STEM majors. The proposed project analyzes two existing metacognitive strategies through the framework of cue-utilization. Two new potential strategies are explored: in one, metacognitive prompts are interspersed at regular intervals in a Jupyter notebook assignment; in the other, metacognitive prompts are presented after completion of the Jupyter notebook tasks. Comparing the efficacy of these two strategies may provide insight into best practices for early and more advanced college learners in STEM, driving future development of combined metacognitive and active learning activities for college chemistry.

### 23. MCANALLY, KAYLYN

#### **Inclusive teaching practices and culturally responsive science teaching in graduate teaching assistants: A qualitative analysis**

One way to mitigate the effect of sociostructural disparity and systemic oppression on historically marginalized students in science classrooms is through culturally responsive science teaching (CRST; Barron et al., 2021), a pedagogical approach based on student empowerment, cultural competence, and sociopolitical consciousness (Ladson-Billings, 1995). Although CRST and other culturally-centered pedagogies have been linked with improved student outcomes as measured through student empowerment, self-efficacy, and ethnic and academic identity (Aronson & Laughter, 2016), more research assessing whether graduate teaching assistants (TAs) in college science are familiar with and prepared to engage in CRST is needed. During the COVID-19 pandemic, we conducted two training sessions for inclusive teaching practices and CRST adapted from Barron and colleagues (2021) during a graduate course focused on teaching and learning in the sciences at UC Merced, a large, research-intensive Minority-Serving Institution. Before and after the relevant training, we collected surveys and written teaching reflections from five graduate teaching assistants who participated in the training and consented to participate in the study. We used inductive, open-coding (Saldaña, 2015) to generate a preliminary picture of how graduate teaching assistants described their experiences with

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inclusive teaching and CRST. Preliminary themes indicate that prior to the intervention, graduate TAs felt they lacked training in inclusive practices and CRST, but still were intentional in providing their students individualized attention and tried to connect class material with current events. After the intervention, graduate TAs reported using inclusive practices and CRST through encouraging shared student experiences and promoting growth mindsets, while a lack of time and training remained a barrier to implementation. These findings may inform future graduate teaching assistant training which aim to bolster graduate TAs beliefs and behaviors regarding inclusive teaching practices and CRST with the goal of refining science higher education to be equitable for all.

### 24. PENNINGTON, LILLIE

#### **Are all labs equal? An investigation of student self-efficacy and its relation to different lab types.**

Whether or not a student believes they can perform well in STEM is their self-efficacy, and self-efficacy can impact student success in STEM. It has been shown that student self-efficacy can be positively impacted by hands on experience with the scientific method, and this experience can be provided by lab classes. However, lab classes can take many different forms, with different types of activities sometimes within one course, for example: wet labs, discussion sections, and field labs. Whether or not different types of lab classes differentially affects student self-efficacy. To address this question, I sent out surveys to students of an upper-level biology lab class after different lab activities to assess self-efficacy. I found that the wet lab had slightly more positive impact on self-efficacy than the field or discussion labs, but none had a negative impact. Further, I analyzed what students felt were barriers to their success in STEM and found students feel that they are unable to understand, communicate, and apply concepts. These survey results suggest that while lab activities do improve self-efficacy, students still feel overall that they are not being prepared for a career in STEM. A more formal link between lecture, lab, and general science skills may further improve student self-efficacy and aid in the removal of student-perceived barriers to their success in STEM.

### 25. LIGUNAS, GLORIA DENISE

#### **The Gene Editing Research Lab — a new classroom-based research experience at UC Merced**

The ability to directly edit genetic sequences with technology like CRISPR/Cas has revolutionized the biological sciences. We have developed a Course-based Undergraduate Research Experience (CURE) that will give students hands-on experience with gene editing techniques that, in a short time, have become standard in biology and biomedical research. Our course introduces students to discovery-based research. Students will learn how to design, execute, and assess gene editing strategies and create unique, user-defined changes in target genes. We recruited 6 undergraduate students for our research team for a trial run in the fall semester of 2021. Each student was assigned one gene and designed and executed a CRISPR-based knock-in strategy for each gene. To accommodate their experience level, we held lectures covering fundamental concepts related to the project such as CRISPR/Cas9, DNA repair, and

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recombinant DNA technology. We also held structured training demonstrations of the protocols to be used in their research — with surprising success: we are currently in the process of identifying germline transmission for 4 of the initially targeted 6 genes. In addition to their lab work, the students were also encouraged to develop their presentation and scientific communication skills; all 6 students presented their work at an end-of-semester symposium attended by members of the Woo and Materna labs and others in our department. Two students presented posters on their work at the annual SACNAS conference in October 2021, and two students presented a poster describing this project at the annual Quantitative and Systems Biology retreat at UC Merced. We hope to provide more opportunities for research participation especially for underrepresented minorities and help increase scientific literacy and critical thinking — in line with the "Vision and Change" (AAAS) recommendations for biology education. Our new course proposal was recently approved by UC Merced and will be offered starting Fall semester 2023.

### 26. SOLLBERGER, DEREK

#### **The Data-Driven Classroom: Consolidating Survey Data about our Courses**

The Data Science for Life Sciences course inherently encourages practice with data analysis, but rapid changes in teaching techniques and modalities led to a desire to gauge the efficacy of these interventions. In this presentation, we will discuss the BioSQuaRE Assessment tool for quantitative biology courses and a pre- and post-survey setup for course learning outcomes. Data visualization tools will quickly summarize statistically significant results within semesters and highlight strengths and weaknesses of the students and instructor across semesters.

### 27. WHITMER, RILEY; VARGAS, SHAIRA

#### **Utilizing COPUS Data to Advance Student Engagement**

The Center for Engaged Teaching and Learning at UC Merced offers the Students Assessing Teaching and Learning (SATAL) Program as a mechanism to support the community of instructors working to enhance teaching and learning on campus. SATAL involves trained undergraduates in the data collection, analysis, and reporting. Instructors can partner with SATAL to assess the teaching and learning experiences of students in their classes by implementing different protocols such as Classroom Observation Protocol for Undergraduate STEM (COPUS). The purpose of this poster is to share the rich information instructors can derive from the COPUS implementation to advance student engagement. The SATAL staff share COPUS results as a fruitful mechanism to document active learning practices complemented with guidelines and suggestion notes. Also, SATAL showcases actions taken based on the COPUS data received and impact on the instructors' experiences as a responsive approach to advance student engagement. Providing wait time, using worksheets, diversifying active learning activities, and adding clicker questions were among the changes introduced by instructors. Moreover, SATAL addresses how the presented assessment practices can be utilized for different purposes apart from classroom assessment, such as action research and tenure and promotion.

### 28. CORTEZ, JAROD

#### **Aligning course materials to improve student learning in an introductory physics laboratory**

In an undergraduate introductory physics lab course, it is crucial that students receive an opportunity to acquire laboratory and research skills that they will take with them as they move through academia to the workplace. Lab questions are addressed in each student's lab notebook. The goals, assignment questions and rubric criteria for a class can be assigned levels of Bloom's Taxonomy, a hierarchical model that describes learning into distinct categories. In this study when the components of the class, lab objectives, questions, and rubric criteria, were not on the same level of Bloom's this was considered as misalignment. This was done for four different labs from the Fall 2021 semester at UC Merced, two of which were based on app-based data collection and two that were hands on data collection using circuits available to or made by students. For the three components, two were compared at a time for alignment giving three total analyses, objectives to questions, objectives to the rubric criteria and questions compared to the rubric criteria. The goals were (1) to determine if alignment exists between these three components, and (2) where is this misalignment happening as well as if it is independent between the three components. Using this analysis, it was determined that there is misalignment in the course, and that some of the labs are aligned in certain aspects such as between objectives and questions while being misaligned when comparing objectives to the rubric criteria. Out of all the different components the rubric was the one which had the most misalignments, demonstrating the need for changes to ensure students are graded fairly. For future semesters the rubric needs adjustment so that the students can be graded on content they are asked to produce with the notebook content as evidence that they fulfilled these goals.

### 29. MENKE, CARRIE

#### **Investigating alignment between learning objectives, question prompts, and rubric criteria in a second-semester introductory physics lab.**

We investigated alignment between course learning objectives, learning objectives for specific labs, prompts within those labs, and rubric criteria for a second-semester introductory physics lab course at UC Merced. Starting in spring 2020, the first- and second-semester labs were redesigned based on the American Association of Physics Teachers (AAPT) recommendations for instructional labs. The course learning objectives align with the AAPT recommendations and learning objectives for the physics major and campus' general education program. However, an explicit check for alignment between the course learning objectives, objectives for specific labs, lab prompts, and rubric criteria was left undone due to the shift to emergency remote instruction. Returning to in-person labs, Jarrod investigated alignment between lab objectives, prompts, and rubric criteria for four second-semester introductory physics lab manuals by applying Bloom's Taxonomy to Fall 2021 materials. We continue this work with Spring 2022 materials, which had been significantly edited.





# ACRONYMS

*Acronyms are listed in order of appearance in the abstracts.*

**AAAS** – American Association for the Advancement of Science

**AAPT** – American Association of Physics Teachers

**ANOVA** – Analysis of Variance

**BioSQuaRE** – Biology Science Quantitative Reasoning Exam

**BIPOC** – Black, Indigenous, People of Color

**BTT** – Brain-Targeted Teaching

**Cas9** – CRISPR-Associated Protein 9

**CIENCIA** – Collaboration for Inclusive and Engaging Curriculum, Instruction, and Achievement

**COPUS** – Classroom Observation Protocol for Undergraduate STEM

**CRISPR** – Clustered Regularly Interspaced Short Palindromic Repeats

**CRST** – Culturally Responsive Science Teaching

**CURE** – Course-based Undergraduate Research Experience

**CV-RISER** – Central Valley Region Interdisciplinary Symposium on Education Research

**DNA** – Deoxyribonucleic acid

**EPOCH** – Engagement, Perseverance, Optimism, Connectedness, and Happiness

**ERT** – Emergency Remote Teaching

**DEI** – Diversity, Equity, and Inclusion

**HSI** – Hispanic-Serving Institution

**LGBTQ+** – Lesbian, Gay, Bisexual, Transgender, Queer, Plus

**MANOVA** – Multivariate Analysis of Variance

**MBES** – Mind Brain and Education Science

**MPEX** – Maryland Physics Expectations Survey

**MSI** – Minority-Serving Institution

**NSF** – National Science Foundation

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**OST** – Out-of-School-Time

**PERMA** – Positive emotion, Engagement, Relationships, Meaning, Accomplishments

**SACNAS** – Society for the Advancement of Chicanos/Hispanis and Native Americans in Science

**SATAL** – Student Assessing Teaching and Learning

**SCL** – Student-Centered Learning

**SEL** – Social-Emotional Learning

**SLO** – Student Learning Outcomes

**STEM** – Science, Technology, Engineering, and Mathematics

**TA** – Teaching Assistant

**TeLRA** – Test of e-Learning Related Attitudes

# INDEX OF PARTICIPANTS

Talk abstract numbers in **bold**; poster abstract numbers in *italics*.

*TO BE ADDED :)*