



GEVIRTZ  
GRADUATE  
SCHOOL OF  
EDUCATION

## GSAE RESEARCH SYMPOSIUM 2021

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LEADING SOCIAL AND  
EDUCATIONAL JUSTICE:  
SERVICE AND RESEARCH  
FOR COMMUNITIES

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MAY 14-15, 2021



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# CONFERENCE INFORMATION

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Thank you for joining this collaborative educational conversation at the second GGSE interdepartmental research conference. The vision of this event is to provide a space for students and faculty to showcase their own work and thinking and to foster connection building within GGSE, as well as with our larger community. Attend paper and poster presentation sessions with other graduate and undergraduate students, postdoctoral scholars, staff members, faculty, or alumni and explore innovative research, degree-related work, and community work. We invite you to network with old and new colleagues and be inspired to collaborate!

Due to the COVID-19 pandemic, this conference is being hosted virtually. Presentations have been organized by themes and will be occurring on separate Zoom links. Feel free to pop in and out of Zoom rooms at your leisure, but be sure to observe regular Zoom etiquette (e.g., keep yourself on mute when not speaking).

Zoom links will be shared with registered attendees via email 24 hours before the beginning of the conference. Please check your inbox for "Symposium Agenda with Zoom links" from GSAE ([education-gsae@ucsb.edu](mailto:education-gsae@ucsb.edu)) for the schedule that contains Zoom links. *Each Zoom link is in this program, either on the "Schedule-at-a-Glance" (page 4) or on the individual session pages.* If you have not registered, you will not receive the Zoom links.

These sessions will function like sessions at an in-person conference. Paper presentations will be 15 minutes or less plus 5 minutes for Q&A. Poster presentations will be 10 minutes or less plus 5 minutes for Q&A. Presenters and session moderators will determine how the session proceeds (e.g., Q&A after each presentation or Q&A after all presentations).

This year we have added a raffle as part of our conference activities! Attendees will have the chance to win one of 15 gift cards valued at \$25 each. You will be able to select a preferred gift card option from a list of approved vendors.

For any general questions about the conference or technical difficulties on the day of the conference, please email GSAE at [education-gsae@ucsb.edu](mailto:education-gsae@ucsb.edu).

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# SCHEDULE AT-A-GLANCE

CLICK EVENT TITLES FOR ZOOM LINKS - ALL TIMES PDT  
FRIDAY, MAY 14, 2021

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KEYNOTE SPEAKER **9:00 AM**  
TINE SLOAN

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SESSION #1: COVID & EDUCATION **10:00 AM**

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SESSION #2A: HIGHER EDUCATION **11:30 AM**  
(PAPERS)  
SESSION #2B: STEM EDUCATION

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SESSION #3: INSTRUCTIONAL SUPPORTS **1:00 PM**

**SATURDAY, MAY 15, 2021**

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SESSION #4A: LITERACY **9:00 AM**  
SESSION #4B: HIGHER EDUCATION  
(POSTERS)

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SESSION #5: IDENTITY & **10:10 AM**  
REPRESENTATION IN EDUCATION

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SESSION #6A: METHODS & ASSESSMENT **11:40 AM**  
SESSION #6B: TEACHER EDUCATION &  
BELIEFS

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POST-CONFERENCE CELEBRATION **1:00 PM**

# KEYNOTE SPEAKER

FRIDAY, MAY 14, 2021  
9:00-9:50 AM

KEYNOTE ADDRESS ZOOM LINK

## TINE SLOAN

Tine Sloan is a Teaching Professor (LSOE) in the Department of Education. She previously served as the Director of the Teacher Education Program. She is currently the lead investigator for the California Teacher Education Research and Improvement Network (CTERIN), a research collaborative across nine UC campuses working with CSU and private universities to understand and improve the preparation of teachers for California.

Tine is actively involved in State policy issues on teacher preparation and represents the University of California as a Commissioner on the California Commission on Teacher Credentialing. She is also involved in California and national initiatives on teaching performance assessments (PACT, edTPA, CalTPA), serving on development and implementation teams and as a consultant to states and other institutions.

Tine's research interests also include international contexts of teacher preparation, working closely with partners in multiple research and practice collaborations. Her previous work as Director of Teacher Education Program targeted programmatic issues in teacher preparation including the study of interventions and the use of teaching performance assessments and other data in teacher preparation practice. All of her work aims to understand how to prepare and support teachers who can meet the diverse needs of California's students, ensuring their well-being while preparing them for success in the 21st century.



# SESSION #1

FRIDAY, MAY 14, 2021

10:00-11:20 AM

(Session end time is tentative and dependent on discussion)

## COVID AND EDUCATION

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### SESSION #1 ZOOM LINK

*An Analysis of Teacher Educator Pedagogies and Preservice Teacher Experiences During the Covid-19 Pandemic*  
Valerie Valdez

*Education in the COVID-19 Era: A study of the organizational changes made within informal educational programs due to COVID*

Jasmine Mitchell (she/her), Alexandria Muller (she/her), Devon M. Christman (she/her), and Diana Arya (she/her)

*Online Teaching During a Pandemic: Critical Reflections of Virtual Engagement Strategies*

Ryan Arellano (she/her) and Mary Franitza (she/her)

*Who Am I Now: Looking at Undergraduate's Self-Perceived Identity During the COVID-19 Pandemic*

Nathalie Paesler (she/her), Alexandria Muller (she/her), Devon M. Chrisman (she/her), and Diana Arya (she/her)

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# SESSION #2A

FRIDAY, MAY 14, 2021

11:30-12:50 AM

(Session end time is tentative and dependent on discussion)

## HIGHER EDUCATION

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### SESSION #2A ZOOM LINK

*Examining geoscience graduate teaching assistants' experiences and perceived training needs for classroom and field settings*

Allyson Randall (she/her/hers), Matthew Rioux (he/him/his), Alexandria Muller (she/her/hers), and Julie Bianchini

*Filling the Void: The Role of Seminars in Supporting First-Year Students*

Krista Lucas (she/her), Liliana Garcia (she/her), and Alexandria Muller (she/her)

*Grad School Guidance: A First-Gen Graduate School Mentorship Initiative*

Sofi Sanabria (she/her | ella)

*Multilevel mentorship in a community-based school program, "Who is mentoring who?"*

Mary Franitza (she/her), Valerie Meier (she/her), and Amanda Andersen (she/her)

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# SESSION #2B

FRIDAY, MAY 14, 2021  
11:30-12:50 PM

(Session end time is tentative and  
dependent on discussion)

## STEM EDUCATION

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### SESSION #2B ZOOM LINK

*How Preservice Secondary Science Teachers Implement NGSS  
in the Context of Engineering*

John Galisky, Meghan Macias, Matthew Bennett, Sarah  
Hough, and Julie Bianchini

*Transfer Students' Self-Regulation in Routine and Non-  
Routine Proofs*

Royce Olarte (he/him), Sarah A. Roberts, Hani Pajela, and  
Damaris Hernandez

*Hearing the Engineering in Children's Talk*

Ron Skinner (he/him/his), Danielle Harlow (she/her), and  
Alexandria Muller (she/her)

*Crafts to Communicate: How first-grade students leverage  
physical representations of design solutions to communicate  
ideas in engineering activities*

Alexandria Muller (she/her), Ron Skinner (he/him/his), and  
Danielle Harlow (she/her)

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# SESSION #3

FRIDAY, MAY 14, 2021

1:00-2:00 PM

(Session end time is tentative and dependent on discussion)

## INSTRUCTIONAL SUPPORTS

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### SESSION #3 ZOOM LINK

*How Preservice Secondary Science Teachers Support Scientific Sensemaking and Discourse Across Disciplines*

Valerie Meier (she/her), Matthew Bennett (he/him), John Galisky (he/him), Sarah Hough (she/her), and Julie Bianchini (she/her)

*How Preservice Science Teachers Understand Language Opportunities, Demands, and Supports Related to Science and Engineering Practices*

Stacey Carpenter (she/her), Meghan Macias (she/her), Erik Arevalo (he/him), and Julie Bianchini (she/her)

*Productive Struggle with Multilingual Learners Using Language Routines*

Cameron Dexter Torti (he/him/his), Tomy Nguyen (he/his), Royce Olarte (he/him), Sarah Roberts, and Julie Bianchini (she/her)

*Moving towards meaning making in multiplication: A preliminary report for number string interventions for number sense*

Tomy Nguyen (he/his), Rachel Lambert (she/her), Monica Mendoza (she/her), and Avery McNiff (she/her)

# SESSION #4A

SATURDAY, MAY 15, 2021

9:00-10:00 AM

(Session end time is tentative and dependent on discussion)

## LITERACY

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### SESSION #4A ZOOM LINK

*Fox, Cat, and Tacocat: 3rd Grade Students' Models of Quantum Superposition*  
Devon M. Christman (she/her/hers)

*Raising critical readers in the 21st Century: Developing a critical reading assessment*  
Diana J. Arya (she/her/hers/they/them/theirs) and Sabiha Sultana (she/her/hers)

*Concept Maps as a Measure of Reading Comprehension*  
John Galisky

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# SESSION #4B

SATURDAY, MAY 15, 2021

9:00-10:00 AM

(Session end time is tentative and dependent on discussion)

## HIGHER EDUCATION

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### SESSION #4B ZOOM LINK

*Undergraduate considerations when selecting a major to study at a four-year institution*

Claire Chen (she/her), Alexandria Muller (she/her), Devon M. Chrisman (she/her), and Diana Arya (she/they)

*A Qualitative Inquiry into Underserved AAPIs' Experiences as they Navigate Higher Education During COVID-19*

Ryan Arellano (she/her)

*Into the Unknown: An exploration into the lived experiences of undergraduate students*

Alexandria Muller (she/her), Devon M. Christman (she/her), Claire Chen (she/her), Diana Arya (she/her/they/their)

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# SESSION #5

SATURDAY, MAY 15, 2021

10:10-11:30 AM

(Session end time is tentative and dependent on discussion)

## IDENTITY AND REPRESENTATION IN EDUCATION

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### SESSION #5 ZOOM LINK

*“Obviously you’re not going to just cater to straight people”:  
Sex(uality) health education, representation, and liberation in  
and beyond the classroom*

Jenny Sperling (she/her)

*Taiwanese American Heritage Language Speakers' Voicing  
Practices and Identity*

Huay Chen (she/her)

*Draw-a-Scientist: Non-STEM Majors' Identity Work*

Krista Lucas (she/her) and Jasmine Evans (she/her)

*Youth Perceptions of Authors and Scientists in an Afterschool  
Program*

Kassandra Ortega (she/her), Alexandria Muller (she/her),  
Devon M. Chrisman (she/her), and Diana Arya (she/they)

*Co-Constructing STEM Identity and Enriching Recruitment and  
Retention Processes through Introductory College Coursework*

Miriam Burnett

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# SESSION #6A

SATURDAY, MAY 15, 2021

11:40-1:00 PM

(Session end time is tentative and dependent on discussion)

## METHODS AND ASSESSMENT

### SESSION #6A ZOOM LINK

*Auxiliary variable visualization in mixture models: A Shiny application*

Dina Arch (she/her/hers)

*Computer-assisted Heart Rate Variability Biofeedback as a Method of Stress Reduction for Parents of Children with Challenging Behaviors: A Pilot Case Study*

Destiny Hoerberg (she/her/hers)

*Somewhat an Engineer?: A Rasch Model analysis of likert-scale items to understand student ideas about scientists and engineers*

Devon M. Christman (she/her) and Alexandria Muller (she/her)

*Positive Contribution in Chinese Families of Children with Autism Spectrum Disorders*

Yixin Lin (she/her)

*Civic Engagement and Perceptions of Representation in High School Learning Environments*

Mary Franitza (she/her) and Cameron Dexter Torti (he/him/his)

# SESSION #6B

SATURDAY, MAY 15, 2021

11:40-1:00 PM

(Session end time is tentative and  
dependent on discussion)

## TEACHER EDUCATION AND BELIEFS

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### SESSION #6B ZOOM LINK

*Equity Practices of Teacher Education Programs*

Michael Lloydhauser (he/him)

*Utilizing Counter Narratives for Student Investigative Learning*

Cameron Dexter Torti (he/him/his)

*Investigating Preservice Mathematics Teachers Reported*

*Conceptions of the Standards for Mathematical Practice*

Alexis Spina


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SATURDAY, MAY 15, 2021  
1:00-2:00 PM

# POST-CONFERENCE CELEBRATION

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POST-CONFERENCE CELEBRATION  
ZOOM LINK



We are thrilled the conference provides an opportunity to share some of the scholarly work occurring in GGSE, but we are also excited this is an opportunity to bring together so many members of our community!

Join us for some fun after the conference!  
We look forward to seeing you there!



# VOLUNTEER ACKNOWLEDGEMENT

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We are grateful for the contributions of many members of our GGSE community for providing their time, energy, and expertise towards making the conference happen.

Without the help of these members of our GGSE community, the conference would not have been possible.

## **Moderators:**

- Erik Arevalo
- Miriam Burnett
- Devon M. Christman
- Cameron Dexter Torti
- Mary Franitza
- Samantha Harris
- Meghan Macias
- Alexandria Muller
- Tomy Nguyen

## **GSAE Conference Organizers:**

- Meghan Macias
  - Mary Franitza
  - Diana Chagolla
  - Cameron Dexter Torti
-



# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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*A Qualitative Inquiry into Underserved AAPIs' Experiences as they Navigate Higher Education During COVID-19*

Ryan Arellano (she/her)

Session #4B - Higher Education (Saturday, May 15, 2021 - 9:00 am)

Abstract: Research has shown that underserved Asian American and Pacific Islander (AAPI) students often face higher education challenges that go unnoticed due to the Model Minority Myth (MMM). These obstacles are now being exacerbated by a global pandemic which has been accompanied by an increase in racial tensions, a recession, and adverse health outcomes. This study took a qualitative approach to uncover high-achieving underserved AAPI experiences as they navigate higher education during a time of high stress and financial instability. Interview data showed that AAPIs are experiencing racism fueled by COVID-19 and that this discrimination is essentializing this population of students. Moreover, data has shown that a lack of ethnic student organizations and low perceived institutional support during a time of heightened marginalization are weakening AAPIs' ties to the university. These findings imply the need for institutional efforts to support these students during a global pandemic and maximize resources that will aid in their retention.

Themes: Higher Education, Racism, Asian American and Pacific Islander Students

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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*An Analysis of Teacher Educator Pedagogies and Preservice Teacher Experiences During the Covid-19 Pandemic*

Valerie Valdez

Session #1 - COVID and Education (Friday, May 14, 2021 - 9:00 am)

Abstract: In March of 2020, most countries experienced lockdowns which led to the immediate closure of K-12 schools and universities. With little time to prepare for this transition, this abrupt shift to distance learning heavily disrupted students' and families' lives, completely altered how students attended school, and how teachers were expected to teach. This also applied to teacher education. This study seeks to understand how teacher educators and preservice teachers encountered and experienced the challenges and opportunities presented with remote instruction, and how they adapted amidst such unexpected circumstances (Flores and Gago 2020; Quezada et al., 2020). I also hope to raise discussions about the nature of teaching and possible ways to not only see remote learning as a detriment to learning or professional development this year, but to highlight the positive aspects that have emerged from, in terms of both technological advances/proficiencies as well as personal characteristics of teacher educators and preservice teachers. The framework for this study is centered around the theory of situated learning (Lave, 1991). Lave states, "participation as members of a community of practice shapes newcomers' identities and in the process gives structure and meaning to knowledgeable skill " (p. 94). Thus, working with teacher educators, supervisors, cooperating teachers, and students provides the context in which preservice teachers can learn and develop the skills, knowledge, and dispositions that are necessary to becoming an effective teacher. While situated learning is occurring within this format, this study focuses on the remote instruction context. My analysis of teacher education through remote instruction is based on the theory of transactional distance, which posits that in distance learning, separation between the teacher and students can "lead to communication gaps, a psychological space of potential misunderstandings between the behaviors of instructors and those of the learners" (Moore & Kearsley, 1996, p. 2013 as cited in Moallem, 2015). This study poses the following research questions: RQ1: How do teacher educators and preservice teachers feel about remote instruction (may change to hybrid/in-person later in the year) during this academic year? What have been the successes? What have been the challenges? RQ2: How has teacher education content been presented and discussed by a teacher educator and preservice teachers in a practicum course? The methods of investigation for this study are qualitative in nature and based around two forms of data: semi-structured interviews and the observation of a practicum course for preservice teachers.

Themes: Teacher education, Remote instruction

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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*Auxiliary variable visualization in mixture models: A Shiny application*

Dina Arch (she/her/hers)

Session #6A - Methods and Assessment (Saturday, May 15, 2021 - 11:40 am)

Abstract: This proposal is an update on the Shiny application presented last year. This project presents an online application that may be used to visually display auxiliary relation information in the context of mixture models. Data visualization in mixture models may appear as trivial tasks to some methodologists (e.g., producing bar charts of conditional latent class probabilities, computing conditional transition probabilities, etc.), but is often less obvious to most or all others. Conventions for data and model results visualizations in the mixture model setting are virtually nonexistent for both methodologists and applied users. The very few conventions that do exist, e.g., conditional item profile plots, have significant limitations that are rarely addressed. As a consequence, even the most simplistic graphical displays and numerical summaries of model results are not automatically generated in software packages used to estimate the mixture models. The current necessity of transferring model results to produce visual displays that effectively communicate the meaning of the results to non-technical audience results in most of these post-processing tasks never being done, impeding the researcher's understanding of their results as well as limiting the explanation and discussion thereof. One hurdle to appropriately applying the rapidly advancing methodological techniques of mixture modeling is access to high-quality training that provides not only the theoretical foundations of the methodology but also supports the application of the methodology to issues in the field of education. There is a sizable amount of research related to mixture models that present methodological innovations, developments, and model extensions that are often written by methodologists for methodologists. Our new methodological innovation creates a tool that can easily create figures for mixture models. This methodological innovation, designed using Mplus, R, and Shiny Apps using R, provides support for the use of graphical presentation of findings, not relying on just reporting statistical parameter estimates. It supports alternative ways of highlighting key findings that help communicate results to a more extensive education research community, such as practitioners and policymakers. By supporting the use of graphics and visualizations, the results of these complex models are made more accessible to a broader audience, increasing the impact of the work.

Themes: Methodology, Latent Class Analysis, Shiny

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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*Civic Engagement and Perceptions of Representation in High School Learning Environments*

Mary Frantza (she/her) and Cameron Dexter Torti (he/him/his)

Session #6A - Methods and Assessment (Saturday, May 15, 2021 - 11:40 am)

Abstract: The goal of this project is to examine the ways in which individuals experience civic education in their high school learning environments as well as any potential connection to the same individuals' civic engagement as young adults. Issues of representation in learning environments have been called into question, and this study seeks to understand the experiences of individuals as it relates to this issue. Based on a pilot set of interviews conducted solely for a class project, it became evident incorporating measures for civic engagement and comparing these with an individual's high school civics education experiences may provide critical insight into an ongoing issue of equity in our society.

Themes: Student Engagement, Social Justice, Curriculum/Representation

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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*Co-Constucting STEM Identity and Enriching Recruitment and Retention Processes through Introductory College Coursework*

Miriam Burnett

Session #5 - Identity and Representation in Education (Saturday, May 15, 2021 - 10:10 am)

Abstract: This research seeks to to foster equitable pathways to ensure a diverse population of students move into science, technology, engineering, and mathematics (STEM) higher education courses, stay there, and graduate. It is revealed that STEM driven by methods of inquiry and argumentation without a culturally relevant pedagogy does not ensure equity and inclusion for marginalized students underrepresented in the subject disciplines and further displaces them by denying opportunities for diverse student groups to co-construct a relational identity within STEM. An analysis of a culturally relative pedagogy in STEM can serves as an entry point for science educator to foster equitable classroom environments that ensures all students have equitable access to develop their competencies, build cultural, social, and linguistic experiences within the subject discipline. This study supports the deconstruction of the western hegemonic scientific paradigm to act as an impetus to encourage innovation and exploration within the 21 century global workforce, and assist with recruiting, supporting, and retaining a scientific community in higher education that reflects the diversity of the America population. This work assists to produce scholarship to advance our understanding of marginalized students of color entering STEM majors. Methodology explores if, and how teachers have employed a culturally relative science curriculum that promotes equity and inclusion especially for those groups more like to drop out of introductory coursework in disproportionate numbers.

Themes: Equity, Inclusion, STEM Identity

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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*Computer-assisted Heart Rate Variability Biofeedback as a Method of Stress Reduction for Parents of Children with Challenging Behaviors: A Pilot Case Study*

Destiny Hoerberg (she/her/hers)

Session #6A - Methods and Assessment (Saturday, May 15, 2021 - 11:40 am)

Abstract: Parents of children with developmental disabilities or conduct disorders who engage in high rates of externalizing problem behavior often experience higher levels of stress, anxiety (Singer, Ethridge, & Aldana, 2007), and depressive symptoms (Singer, 2006) than parents of typically developing children. In addition to parent training to target and decrease the presence of problem behaviors in children, psychoeducational support and stress management training has been used to directly treat parental stress. Mindfulness Based Stress Management (MBSM; Kabat-Zinn & Hahn, 1982) has shown significant promise in decreasing stress and depressive symptoms in parents (Dykens et al. 2015) and reducing children's problem behaviors (Singh et al. 2006). However, it is unknown what particular parental behavior changes are associated with mindfulness or are the mechanisms (i.e.: affect, tone, facial expressions, language, etc.) of the functional relationship between MBSM training. Additionally, the time and cost necessary to teach and ensure maintenance of the skills required in MBSM may exceed the expectations, willingness, and ability for parents to participate and acquire such skills. A recent development in biofeedback training has demonstrated the effects of monitoring and controlling heart rate variability (HRV) on symptoms of stress and as a method of relaxation training. HRV has been deemed a valid measure of activity within the parasympathetic nervous system, which is the same system involved in the experienced mental and physical characteristics of mindfulness and deep meditation (Cohen et al. 2000; Porges, 2003). The current study uses an alternating treatment, A-B-A-B, single case research design, to explore the effects of a biofeedback device known as HeartMath on the experienced stress and behaviors of a parent participant of a child with Autism Spectrum Disorder (ASD). While the study is ongoing, some results demonstrating lowered stress and anxiety symptoms and a change in parental behavior have been obtained. The results of this study may support the use of HRV biofeedback training as a more practical and feasible method of MBSM training for parents than traditional forms as well as narrow the focus of current behavioral parent training methods to more specific features of interactions between parent and child.

Themes: Disability Studies, Behavior Parent Training, Biofeedback Stress Management Training

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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*Concept Maps as a Measure of Reading Comprehension*

John Galisky

Session #4A - Literacy (Saturday, May 15, 2021 - 9:00 am)

Abstract: The purpose of language is to communicate ideas and information, but most measures of reading comprehension, with heavy reliance on multiple choice items, and especially for English-learners, actually measure students' ability to comprehend the questions. Multiple choice items are useful for measuring the extraction of specific information but not for measuring how students are interacting with text to construct new knowledge. Also, though decoding individual words and knowing their meanings is fundamental to comprehending any text, measuring vocabulary is insufficient to learn how students construct meaning. Good reading comprehension instruments should include open-ended items that allow readers to construct their own meaning. Though prior knowledge is clearly relevant to measures of reading comprehension, it is difficult to measure prior knowledge without providing cues as to what students are going to read. Good reading comprehension instruments should also measure prior knowledge without biasing comprehension. Using concepts maps to measure reading comprehension we can avoid the requirement that students read and understand item phrasing because a concept map is open-ended. Also, a concept map can demonstrate how students extract information from text and use that information to construct new meaning within an existing cognitive structure. Finally, to the extent that a concept map can measure prior knowledge, it can do so without biasing students' reading comprehension. The construct map is based on a continuum of reading comprehension ability along the dimension of extracting information and constructing meaning. It is expected that students with higher reading comprehension abilities will be able to not only extract more information from a given text but also make more connections between those ideas. This talk will focus on six cognitive interviews conducted with middle school students. Each was given the same text and each drew a concept map while they read. The concept maps were scored on multiple criteria that measure how much information the students extracted from the text and how they linked that information together. Based on these interviews and a theoretical construct, concept maps appear to be a reasonable, open-ended tool for measuring reading comprehension along this dimension.

Themes: Reading, Measurement, Cognition

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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*Crafts to Communicate: How first-grade students leverage physical representations of design solutions to communicate ideas in engineering activities*

Alexandria Muller (she/her), Ron Skinner (he/him/his), and Danielle Harlow (she/her)  
Session #2B - STEM Education (Friday, May 14, 2021 - 11:30 am)

Abstract: Communication of ideas is not limited to verbal interactions, but also spans body language, gestures, eye movement, and more. In elementary classrooms where young students are in the process of developing their verbal capacities, attention to these non-verbal methods of communication may provide insight into thought processes that would otherwise not be noticed. With the introduction of the NGSS, many students are now engaging in engineering for the first time on a national level. In engineering education, students often work to solve a design challenge which results in the production of a prototype of their design solutions. These creations can be used to assist in communicating ideas with peers and instructors. We investigated how first grade students use the prototypes of their design solutions to communicate ideas around their engineering design process with an adult. This study is part of a larger NSF-funded project that engaged students in an engineering design field trip to a local interactive science center along with pre and post field trip classroom activities. We focus on one module that challenged students to design a craft that could slow the fall of a washer (in the classroom) or hover in an upward moving column of air (in the field trip). For this study, we identified seven videos across the module of first-grade students explaining their design solutions to an adult while holding their crafts in their hands. In this paper, we explore how students' use of gestures and prototypes of their design solutions to communicate ideas overlap and differentiate to understand how student sense-making can be understood through each.

Themes: Engineering Education, Informal to Formal Education, Video Analysis

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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### *Draw-a-Scientist: Non-STEM Majors' Identity Work*

Krista Lucas (she/her) and Jasmine Evans (she/her)

Session #5 - Identity and Representation in Education (Saturday, May 15, 2021 - 10:10 am)

Abstract: The Draw-a-Scientist test has been administered for nearly 50 years, mostly in the context of school-age children. It has provided insights into how children's conceptions of scientists have changed in this time, along with how children might identify with scientists (Yong, 2018). A simple version of this test was given to a class of 23 non-STEM majors taking a biology course. After taking this test twice (once at the beginning and once at the end of term), several students showed an increase in scores, where students drew themselves and/or put their scientists in non-traditional settings. While the majority (66%) of participants showed no significant change between the pre- and post-test, 22% (n=5) of participants showed increases that were qualitatively meaningful. Focusing beyond childhood age and outside the STEM career path, this work is valuable for gaining an insight into how people, who may begin engaging with science through stereotypical, traditional views of science and scientists, can come to see science as more relevant to their lives in varied contexts and possibly see themselves as agents in that activity. This work supports that science education research should extend to all populations, not only those deemed important for their science-centric academic and career pursuits.

Themes: Science Identity, Undergraduates, Qualitative Methodology

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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*Education in the COVID-19 Era: A study of the organizational changes made within informal educational programs due to COVID*

Jasmine Mitchell (she/her), Alexandria Muller (she/her), Devon M. Christman (she/her),  
and Diana Arya (she/her)

Session #1 - COVID and Education (Friday, May 14, 2021 - 10:00 am)

Abstract: In response to the COVID-19 pandemic, educational programs have changed drastically in their organization and function. Programs that integrated in-person or hands-on activities to create an immersive experience for their students were required to adapt to create COVID-friendly learning environments. For many, this change was sudden and unexpected, requiring program directors to quickly reorganize their curriculum in order to continue serving their community. We investigate the shift from in-person programming to COVID-safe programming across multiple educational programs offered by a university in central California. These programs all support a common goal to develop and build upon literacy skills taught in schools while supporting the development of student identities and self-efficacy in STEM and environmental stewardship. Prior to the global pandemic, these programs engaged youth in hands-on experiences that focused on writing and reading in community and STEM-related contexts. They also encouraged learning related to social and cultural issues in order to promote social equity. Most of the programs were affected by COVID-19 and underwent significant shifts in organization. We interviewed members in leadership positions from these various programs to understand how each approached adapting their respective programs to pandemic conditions. Emergent coding was used to identify key themes related to challenges programs faced, affordances and limitations of the virtual space, and organizational restructuring. This poster highlights these findings and outlines strategies and resources used by the programs.

Themes: Remote Education, How Education has Changed Due to COVID-19, Educational Programs' Relationship with the Community

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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*Equity Practices of Teacher Education Programs*

Michael Lloydhauser (he/him)

Session #6B - Teacher Education and Beliefs (Saturday, May 15, 2021 - 11:40 am)

Abstract: Some time ago, Cochran-Smith (2005) discussed new paradigms in teacher education, including what she termed three closely coupled issues: (a) teacher education as a policy problem; (b) teacher education as research and evidence based; and (c) teacher education as driven by outcomes. Cochran-Smith also indicated that in "some teacher institutions particularly those that prepare teachers for urban schools, educators are conceptualizing work for equity and social justice as an outcome of teacher preparation in and of itself" (p. 11). Since her writing, the literature has expanded in the areas of equity and social justice including the specific topic of critical race theory. In addition to summarizing Cochran-Smith's work, and other/more recent work in the area of equity/critical race theory (e.g., Brown, 2014; Cheruvu et al., 2015) in teacher education, there is literature that provides examples of teacher education programs engaging in equitable practices. In this review of the literature, I discuss the emergence of equity concerns in teacher education, highlight equitable and inequitable practices and make recommendations for practices that teacher education programs can enact. Included in this are efforts to diversify the teacher education landscape as well as the need to prepare all teachers for teaching racially, linguistically and ethnically diverse learners.

Themes: Equity, Pre-service Teacher Education, Social Justice

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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*Examining geoscience graduate teaching assistants' experiences and perceived training needs for classroom and field settings*

Allyson Randall (she/her/hers), Matthew Rioux (he/him/his), Alexandria Muller (she/her/hers), and Julie Bianchini

Session #2A - Higher Education (Friday, May 14, 2021 - 11:30 am)

Abstract: In many universities, graduate teaching assistants (GTAs) are responsible for leading undergraduate laboratory and discussion sections connected to large lecture courses. GTAs in the geosciences are challenged even further by being tasked with leading specialized field-based classes. However, research addressing the topic of GTA training in the geosciences remains limited and focuses primarily on classroom-based discussion sections (Dotger, 2011). In addition to not investigating field-based course work, the existing literature also does not assess the perceived training needs from the GTAs' perspective, but rather focuses on faculty members' perspectives (Teasdale et al., 2019). Here, we present preliminary results from a case study of geoscience GTAs in a research-intensive university, with the goal of understanding current challenges, support systems, and perceived training needs from the perspective of GTAs. In our qualitative study, we interviewed 18 geoscience graduate students about their GTA experiences. GTAs who were involved in courses with a field-based experience (n=12) were asked additional questions about those courses, to identify if they desired further field-specific training or support when preparing for their courses. We are in the process of coding these interviews for themes centered around perceptions of existing training and support, challenges facing geoscience GTAs, and desired training and supports to develop a richer understanding of the needs of GTAs within a geoscience department. When completed, this study will provide insight into the unique perceived training needs for geoscience GTAs -- to inform more effective training so as to lead to better learning outcomes for undergraduates and better professional development experiences for graduate students.

Themes: Graduate Teaching Assistant Training; Challenges/Perceived Needs Unique to Geoscience GTAs; Differences for GTAs in Classroom and Field Settings

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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*Filling the Void: The Role of Seminars in Supporting First-Year Students*

Krista Lucas (she/her), Liliana Garcia (she/her), and Alexandria Muller (she/her)  
Session #2A - Higher Education (Friday, May 14, 2021 - 11:30 am)

Abstract: In many universities, graduate teaching assistants (GTAs) are responsible for leading undergraduate laboratory and discussion sections connected to large lecture courses. GTAs in the geosciences are challenged even further by being tasked with leading specialized field-based classes. However, research addressing the topic of GTA training in the geosciences remains limited and focuses primarily on classroom-based discussion sections (Dotger, 2011). In addition to not investigating field-based course work, the existing literature also does not assess the perceived training needs from the GTAs' perspective, but rather focuses on faculty members' perspectives (Teasdale et al., 2019). Here, we present preliminary results from a case study of geoscience GTAs in a research-intensive university, with the goal of understanding current challenges, support systems, and perceived training needs from the perspective of GTAs. In our qualitative study, we interviewed 18 geoscience graduate students about their GTA experiences. GTAs who were involved in courses with a field-based experience (n=12) were asked additional questions about those courses, to identify if they desired further field-specific training or support when preparing for their courses. We are in the process of coding these interviews for themes centered around perceptions of existing training and support, challenges facing geoscience GTAs, and desired training and supports to develop a richer understanding of the needs of GTAs within a geoscience department. When completed, this study will provide insight into the unique perceived training needs for geoscience GTAs -- to inform more effective training so as to lead to better learning outcomes for undergraduates and better professional development experiences for graduate students.

Themes: Graduate Teaching Assistant Training; Challenges/Perceived Needs Unique to Geoscience GTAs; Differences for GTAs in Classroom and Field Settings

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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*Fox, Cat, and Tacocat: 3rd Grade Students' Models of Quantum Superposition*

Devon M Christman (she/her/hers)

Session #4A - Literacy (Saturday, May 15, 2021 - 9:00 am)

Abstract: Quantum computing is becoming an increasingly important field of study poised to revolutionize the computing industry. With the rise of quantum technology, we are seeing the need for a more developed quantum literate workforce. However, simply introducing basic computing concepts to young learners is not enough, as quantum computing requires that computer scientists learn an entirely different way to program with new and complex constraints. Many of these new methods require not only a basic understanding of computing, but also a deeper understanding of quantum physics as well. Ideas such as reversibility, entanglement, measurement disturbing state, and superposition are fundamental building blocks for creating a deeper understanding of quantum computing. This study used data collected from a large, urban, 3rd grade classroom located in the Midwestern United States to examine how students create their own models of quantum superposition and to what extent they demonstrate understanding of the concept as defined by previously created learning trajectories. This study also offers insight on how to improve future instruction surrounding quantum concepts for young learners.

Themes: Science Education, Quantum Computing, Analogical Models

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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*Grad School Guidance: A First-Gen Graduate School Mentorship Initiative*

Sofi Sanabria (she/her | ella)

Session #2A - Higher Education (Friday, May 14, 2021 - 11:30 am)

Abstract: With increasing rates of first-generation students enrolling in higher education institutions, the need for effective support systems has become prevalent for first-generation student success. The presenter will highlight an on-going graduate school peer mentorship initiative catered to the advancement of first-generation students in graduate programs hosted by the Graduate Student Mentor of a successful academic resource center. The presenter will share the development and impacts of the first-generation graduate school support initiative as well as the benefits of implementing similar programs in outside programs and institutions. The session will examine the values necessary to creating successful mentorship bonds; identifying the roles that vulnerability, authenticity, and accessibility hold in successful mentoring relationships as well as the mutual benefits of graduate school mentorship, such as the transfer of knowledge, the strengthening of networks, and the increased sense of belonging. The presenter will share their experience as the Graduate Student Mentor assisting students while learning to navigate graduate school, the creation of programs and events based on student needs, outreach efforts to support students during remote learning, and the benefits of being a mentor, including self-fulfillment, leadership, and professional skills. The presenters will also share the common concerns and questions asked by first-generation undergraduate students in their pursuit to graduate school.

Themes: First-Generation College Students, First-Gen Initiatives, Graduate School Mentorship

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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### *Hearing the Engineering in Children's Talk*

Ron Skinner (he/him/his), Danielle Harlow (she/her), and Alexandria Muller (she/her)  
Session #2B - STEM Education (Friday, May 14, 2021 - 11:30 am)

Abstract: Incorporating engineering design in K-6 science instruction is an important step in engaging children in the practices of engineering and science. Informal learning environments, like interactive science centers, are well-poised to carry out that work with open-ended design-based challenges that allow flexibility in approach. Children bring assets in their everyday problem-solving skills to such challenges, but their language and the ideas they express might not sound like engineering. In an effort to better understand their discourse, we examined video recordings of children of a range of ages in 27 different classrooms engaged in engineering design. This work was part of a project that spanned formal and informal education set in a larger design-based implementation research project. A discourse analysis was conducted using a coding scheme to identify emergent engineering practices in the students' everyday language and problem-solving skills. An example of the analysis is provided and implications for formal and informal educator training are discussed.

Themes: Informal Education, Elementary School Science, Engineering

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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*How Preservice Science Teachers Understand Language Opportunities, Demands, and Supports Related to Science and Engineering Practices*

Stacey Carpenter (she/her), Meghan Macias (she/her), Erik Arevalo (he/him), and Julie Bianchini (she/her)

Session #3 - Instructional Supports (Friday, May 14, 2021 - 1:00 pm)

Abstract: Current science education reforms and standards in the U.S. emphasize engaging students in disciplinary practices of science and engineering. The Next Generation Science Standards (NGSS) highlight eight science and engineering practices (SEPs) that reflect both the investigative and discursive practices of scientists and engineers. As such, these practices are language-intensive and present disciplinary-specific language demands. Models of effective teaching for culturally and linguistically diverse students emphasize the overlapping nature of engaging students in disciplinary practices, providing opportunities for students to produce and use language, and supporting students with disciplinary-specific language demands. In this qualitative study, we are investigating how 42 preservice science teachers from three teacher education programs attended to the language opportunities, demands, and supports related to engaging students in the eight SEPs highlighted in the NGSS. We are analyzing interview and edTPA data to examine how preservice teachers described language production opportunities, demands, and supports related to SEPs and the types of language opportunities and supports they provided as students engaged in SEPs. From a previous analysis, we found that preservice science teachers most frequently discussed language production opportunities, demands, and supports related to the SEP of engaging in argument from evidence. More specifically, preservice teachers described both oral and written language production opportunities for engaging in argument from evidence along with specific supports, most notably the Claim-Evidence-Reasoning framework. For our current analysis, still a work-in-progress, we are examining how preservice teachers attend to the language-intensive nature of the remaining SEPs.

Themes: Preservice Teachers, Science Teaching, Instruction for Culturally and Linguistically Diverse Students

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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*How Preservice Secondary Science Teachers Implement NGSS in the Context of Engineering*

John Galisky, Matthew Bennett, Julie Bianchini, Sarah Hough, and Meghan Macias

Session #2B - STEM Education (Friday, May 14, 2021 - 11:30 am)

**Abstract:** With the implementation of Next Generation Science Standards, science teachers are now expected to engage students in what scientists do through Science and Engineering Practices (SEPs) and in the way scientists think through Crosscutting Concepts (CCCs). Looking at performance assessment portfolios (edTPAs) from preservice secondary science teachers, we wanted to see which Practices and which Crosscutting Concepts were most common, which Practices and Concepts overlap most often, and if the Practices and Concepts that we observed aligned with the standards (Performance Expectations) identified by these teachers. Expecting that students participating in engineering lessons would be highly engaged in the Practices (doing) and the Crosscutting Concepts (thinking) we qualitatively analyzed 36 participants' edTPAs and coded them for the engineering design process (EDP)—isolating 11 that demonstrated an engineering context. We then coded these 11 for SEPs and CCCs. We also found variations in the context in which these engineering lessons were implemented: Preservice teachers engaged students (1) in a full engineering design cycle, (2) in activities with an immediate engineering application, or (3) in activities that provided foundational knowledge for long-term projects. Across these contexts we found that some CCCs were more common than others—cause and effect, patterns, structure and function, and systems and system models. Considering the topics of these lessons, especially in the various engineering contexts, it makes sense that students would be invited to think about these concepts. The SEPs, however, seem to depend on the context of the engineering lessons. Those students who were building foundational knowledge were more engaged in developing models and carrying out investigations whereas those who were applying a full engineering cycle were more engaged in designing solutions. Across all participants and all contexts, though, it was much less common for students to obtain, evaluate, and communicate information, and rarely did they ask questions and define problems. Considering that students work towards PEs across an entire year, and the edTPA represents only 3-5 lessons, it is possible that these SEPs had been (or would be) developed in other instructional sequences. But it should also be considered that preservice teachers may not be instructed in teaching some SEPs with the same depth as others. In combination, the SEPs and CCCs are powerful tools for conceptual development. This work provides clear examples, in multiple contexts, that demonstrate how teachers are able to make them explicit and use them to support student sense-making.

**Themes:** NGSS, Engineering, Teacher Education

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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### *How Preservice Secondary Science Teachers Support Scientific Sensemaking and Discourse Across Disciplines*

Valerie Meier (she/her), Matthew Bennett (he/him), John Galisky (he/him), Sarah Hough  
(she/her), and Julie Bianchini (she/her)

Session #3 - Instructional Supports (Friday, May 14, 2021 - 1:00 pm)

**Abstract:** Given the language-intensive nature of the Next Generation Science Standards as well as broad scholarly agreement about the centrality of language to scientific sense-making (Kelly, 2007; Lee et al., 2013; Lemke, 1990; Lyon et al., 2016), teacher education programs must prepare secondary science teachers who are able to facilitate both language and content learning. While some studies have explored how methods courses that integrate attention to language can develop preservice secondary science teachers' ability to support language in general (Authors, 2020; Rutt & Mumba, 2020), to our knowledge, none have explored potential disciplinary differences in how preservice secondary science teachers support language. However, identifying both differences and similarities across disciplines is critical if teacher education programs are to move beyond offering general guidance on supporting language in science classrooms. Our study investigates how eight preservice secondary science teachers from four disciplines (biology, chemistry, physics, and engineering) supported language as they engaged their students in key scientific and engineering practices (SEPs) and crosscutting concepts (CCCs) articulated in the NGSS (NGSS Lead States, 2013). Our participants were enrolled in the same post-baccalaureate teacher education program and were chosen because of their high scores on the edTPA, a teacher performance assessment required for certification. Using a priori codes corresponding to the eight SEPs, the seven CCCs, and five categories of language supports, we are in the process of qualitatively analyzing participants' edTPA lesson plans and planning commentaries in order to identify salient similarities and differences across disciplines. Based on our findings, we will offer suggestions for how teacher education programs can provide more specific instruction to their preservice secondary science teachers for how to integrate disciplinary discourses, practices, and concepts.

**Themes:** Preservice Secondary Teacher Education; STEM; Disciplinary Language

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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*Into the Unknown: An exploration into the lived experiences of undergraduate students*

Alexandria Muller (she/her), Devon M. Christman (she/her), Claire Chen (she/her), Diana  
Arya (she/her/they/their)

Session #4B - Higher Education (Saturday, May 15, 2021 - 9:00 am)

Abstract: More than ever before, undergraduate students face highly competitive environments throughout their studies, which increasingly demand involvement in multiple extracurricular activities, internships, and research experiences, and, for many, part-time jobs all while maintaining a good grade point average. A recent study found that institutions of higher education, which expressed a commitment to diversity and equity among students, may be perceived by undergraduates, particularly students of color, as unsafe (Arya et al., under review). In order to transform what has been characterized as a pressure-cooker for many students, institutions of higher education must fully understand the shortcomings and negative consequences of current practices in order to develop and maintain spaces that support a diverse student population learning and growing together. We interviewed three upper-division students who were enrolled in political science, art, and sociology programs at a university in central California. This multi-case study traces the lived experiences of these undergraduates navigating their respective studies and highlights key areas of higher education in need of transformation in order to more effectively support the academic achievement and wellbeing of undergraduate students.

Themes: Undergraduate Experiences, Service Learning, Case-study

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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*Investigating Preservice Mathematics Teachers Reported Conceptions of the Standards for Mathematical Practice*

Alexis Spina

Session #6B - Teacher Education and Beliefs (Saturday, May 15, 2021 - 11:40 am)

Abstract: Preservice mathematics teachers today are charged with the challenging yet vital task of learning how to authentically engage their future students in the Standards for Mathematical Practice. These eight practices specify the various levels of competence that mathematics teachers of all levels should explore to see their students flourish. While they are a critical component of the Common Core State Standards for Mathematics and are based on longstanding processes and mathematical proficiencies established in mathematics education, there is little research to date that has looked at how preservice mathematics teachers understand, implement, and engage their students in these practices. This dissertation sought to understand how preservice mathematics teachers conceptualized the Standards for Mathematical Practice throughout their teacher education. Data collection consisted of pre-and-post interviews and completed edTPA portfolios from 47 preservice mathematics teachers from three separate cohorts across four different university teacher education programs in California. I looked at which of the Standards for Mathematical Practice preservice mathematics teachers reported in interviews as the most important to teach, as well as which ones they needed further help in understanding. I looked to see how their responses compared across pre-and post-interviews, as well across the four universities participants were from. Participants overwhelmingly considered Practices 1 and 3 to be the most important to teach regardless of which university they attended. The same applied to which practices preservice mathematics teachers reported needing further support in understanding, which were Practices 4 and 8.

Themes: Preservice Mathematics Teachers, The Standards for Mathematical Practice, Teacher Education

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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*Moving towards meaning making in multiplication: A preliminary report for number string interventions for number sense*

Tomy Nguyen (he/his), Rachel Lambert (she/her), Monica Mendoza (she/her), and Avery McNiff (she/her)

Session #3 - Instructional Supports (Friday, May 14, 2021 - 1:00 pm)

Abstract: Previous research on mathematical education for students with disabilities center on deficits to prescribe behavioral interventions to remedy those deficits. Most school in the US adopt and implement Multi-Tiered Systems of Support (MTSS) interventions that often do not align with the Common Core Standards. This creates difficulties for students to build mathematical meaning and sense making to allow for multiple approaches to mathematics. By shifting the focus to opportunities to make mathematical meaning instead of deficit within the student, an intervention was designed for elementary students (grades 4-6) who are significantly underperforming in multiplication and division including English language learners and students with disabilities. The interventions are designed to encourage student engagement in problem solving, discussion, mathematical practices, and building mathematical number sense with others. Undergraduate tutors facilitated eight strings in small group instructions of 3-6 students over four weeks. The number strings and facilitators encourage students to engage in mathematical discourse of their own thinking of math strategies and of other students' math strategies instead of pure mathematical procedure. By focusing on describing strategies, connections, and adaptations of their own and others' strategies, students mathematical and participation growth for those who are significantly underperforming can be observed. The research questions for this brief report are 1) how does participation in mathematical intervention promote student meaning-making and discussion, 2) what shifts in participation are evident, and 3) what shifts in conceptual and procedural multiplication emerged?

Themes: Number Sense, Math Discourse, Students who Need Support

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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*Multilevel mentorship in a community-based school program, "Who is mentoring who?"*

Mary Franitza (she/her), Valerie Meier (she/her), and Amanda Andersen (she/her)

Session #2A - Higher Education (Friday, May 14, 2021 - 11:30 am)

Abstract: This project explores the mentoring experiences of graduate and undergraduate students involved in an academic outreach program, School Kids Investigating Language in Life and Society (SKILLS). SKILLS brings together graduate and undergraduate students into small teams that develop and teach sociocultural linguistics classes in local high schools, and the SKILLS model assumes that multilevel mentoring (i.e., graduate students mentoring undergraduates, who in turn mentor high school students) provides a distinctive affordance for holistic student development. In this research, we are examining how both graduate student mentors and undergraduate student mentees understood and experienced their mentoring relationships in SKILLS. To answer our research questions, we are using a semi-structured interview protocol that asks participants about the importance of mentoring in relation to broader SKILLS program goals; their mentoring experiences in SKILLS, including expectations, opportunities, successes, and challenges; their perceptions of program support and ideas for program improvement; and the impact that participating in SKILLS has had on their personal and professional development. To date, we have interviewed 28 former undergraduate and graduate SKILLS participants from the past seven years of the program; we anticipate interviewing close to 50 participants total. Preliminary findings indicate that undergraduate mentees were interested in, and at times received, mentoring related to pedagogy, curriculum development, and their own academic and/or personal lives. At the same time, most graduate students expressed the desire for more explicit expectations and targeted training and resources to support their mentoring work. We will also consider how our findings relate to broader questions facing programs that rely on graduate-undergraduate mentoring relationships.

Themes: Secondary Education Student Development, Mentorship, Community/Linguistic Programs

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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*"Obviously you're not going to just cater to straight people": Sex(uality) health education, representation, and liberation in and beyond the classroom*

Jenny Sperling (she/her)

Session #5 - Identity and Representation in Education (Saturday, May 15, 2021 - 10:10 am)

Abstract: While personal choice and circumstance, individual values, or spiritual faith may determine peoples' beliefs around gender and sexuality, school-based sexual health education can be insightful, empowering, and life-saving for all high school youth, specifically sexually-diverse, intersex and gender-variant students. However, most school-based sexual health education remains rooted in white supremacy, heteronormativity, patriarchy, able-bodiedness, and gender and sex stereotypes. Curricular materials and classroom pedagogy create inconsistencies and confusion that may lead to harmful and problematic interpretations that carry into adulthood. By focusing on California legislation and an ethnographic study in a central California high school classroom, this talk will address larger structural powers at play, as well as highlight youth voices. Drawing on classroom observations and student interviews, findings illuminate the ways in which intersex experiences and bodies are not only underrepresented, but also misconstrued. In the end, this talk suggests a deeper, more critical examination of existing institutionalized ideologies, fueled by an intentional commitment to building relationships and community collaborations that approach intersex youth, and all youth, in humanizing, affirming, and non-discriminatory ways.

Themes: Ethnography, Sex Education, High School Youth

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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*Online Teaching During a Pandemic: Critical Reflections of Virtual Engagement Strategies*

Ryan Arellano (she/her) and Mary Frantza (she/her)

Session #1 - COVID and Education (Friday, May 14, 2021 - 10:00 am)

Abstract: Due to COVID-19, nearly all American universities transitioned to virtual learning during the Spring of 2020. Despite having a year to improve and foster better strategies for online engagement, many challenges, like Zoom fatigue, continue to persist. As graduate students, we find it important to be critical of our own experiences in creating a synchronous learning environment. While traditional pedagogical practices are limited due to virtual learning, reflective practices can be a tool used to improve a TA's teaching which in turn enhances student learning at the undergraduate level. It is our responsibility to reflect on our own social positioning and how it influences the culture of our online classrooms. Through student feedback and introspective critical reflections, we highlight the importance of meaningful interactions, engagement, high expectations, and empathy in an online learning environment.

Themes: Online Learning, Critical Reflections, Higher Education

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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*Positive Contribution in Chinese Families of Children with Autism Spectrum Disorders*

Yixin Lin (she/her)

Session #6A - Methods and Assessment (Saturday, May 15, 2021 - 11:40 am)

Abstract: To construct a positive contribution scale for Chinese family of children with autism and examine influential factors to family positive contribution, a survey research was employed. The participants were Chinese parents of children with autism from 16 special education institutions in Guangdong and Chongqing. The survey was translated and adapted from the Kansas Inventory of Parental Perceptions Positive Contributions scale (KIPP-PC). 156 valid surveys was collected and analyzed. After conducting exploratory factor analysis, the adapted scale contained six dimensions, which were closeness and happiness, positive working attitude and career growth, personal growth and maturity, expanded social network, personal and family value and meaning, and learning through experience with special problems. The results indicated that all dimensions in the adapted scale had good reliability, and the adapted scale had good structural validity. The score of overall positive contribution was more than average, meaning that parents had neutral to positive perception of positive contribution. Three influential factors, monthly household income, severity of autism, and parent employment status, were found to have impact on positive contribution. The study implicated that measuring positive contribution for Chinese families of children with autism scientifically could helped identify what may influence family perceptions and well-being and improve family functioning by providing targeted supports.

Themes: Autism, Positive Contribution, Survey

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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### *Productive Struggle with Multilingual Learners Using Language Routines*

Cameron Dexter Torti (he/him/his), Tomy Nguyen, T. Royce Olarte, Sarah Roberts, and  
Julie Bianchini (she/her)

Session #3 - Instructional Supports (Friday, May 14, 2021 - 1:00 pm)

Abstract: This study examines how implementing mathematical language routines affected multilingual learners in Math 1 classrooms engaged in productive struggle. We used three complementary theoretical frameworks—productive struggle, mathematical language routines, and reform-based instruction for multilingual learners to examine two co-taught special education Math 1 classes, investigating video data qualitatively from one student in each class. We found a noted difference in productive struggle between lessons taught prior to the introduction of the mathematical language routines and the lessons in which teachers implemented the mathematical language routines. This study shows how researchers and teachers participating in professional development improved instructional practices and student learning outcomes through engaging students in rigorous and language rich opportunities. Providing appropriate challenge as well as scaffolds in instructional practices, such as mathematical language routines, provides multilingual learners to be engaged with more critical math practices than they are provided in typical learning environments.

Themes: Multilingual Learners, Productive Struggle, Equitable STEM Education

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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*Raising critical readers in the 21st Century: Developing a critical reading assessment*

Diana J. Arya (she/her/hers/they/them/theirs) and Sabiha Sultana (she/her/hers)

Session #4A - Literacy (Saturday, May 15, 2021 - 9:00 am)

Abstract: Literacy practices are shaped by and help shape an increasingly socioculturally diverse population tasked with navigating our digitally expansive, multimodal (print, images, videos, podcasts, etc.) spaces. Yet reading assessments designed to gauge one's readiness to engage in such reading continue to reflect an antiquated goal of digging out main ideas for making sense of print-dominant texts positioned as having authoritative information for readers. Grounded in a sociocultural nature of literacies and informed of the inherent biases in widely used reading assessments, this case study traces the planning, development, and iterative revisions of a culturally inclusive, online reading assessment. The Critical Reading Assessment (CRA) is designed to gauge TK-8 students' comprehension and critical reading agency of digital, multimodal texts. The research question guiding this study is: What affordances, challenges, and subsequent decisions were associated with the development of an assessment that adequately gauges students' critical reading abilities of digital, multimodal texts? Following the superstructure of case study design (Stake, 1995), we employed a descriptive, thematic analysis of data sources gathered over a five-month period. The development period reflected a nonlinear, iterative process, and counter-hegemonic approach to mitigate biases in the CRA development process. We began our inquiry from a sociocultural and critical theory perspective that considers reading as a Heuristic process, in which the participants' voices were united for reform and change. Gathered research of widely used and new qualitative assessment tools developed by literacy experts, field notes, correspondence, and planning sessions were collectively used in developing the CRA. Preliminary findings suggest that feedback from multiple stakeholders, including teachers and parents, are critical for assessment development. Findings from our study may help in similar efforts in developing culturally inclusive, equitable literacy related resources and tools.

Themes: Reading Comprehension, Critical Reading, Assessment

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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*Somewhat an Engineer?: A Rasch Model analysis of likert-scale items to understand student ideas about scientists and engineers*

Devon M. Christman (she/her) and Alexandria Muller (she/her)  
Session #6A - Methods and Assessment (Saturday, May 15, 2021 - 11:40 am)

Abstract: As society moved towards valuing STEM professions in our technology driven world, research emerged aimed at understanding how children perceive scientists in relation to their own identity and at what age children develop stereotypes of science, technology, engineering, and math (STEM) professionals. A popular tool for assessing student identity and understanding of STEM is The Draw a Scientist or Draw an Engineer activity created by Dave Wade Chambers (1983) and adapted by Christine Cunningham (2007) for Engineering is Elementary (EiE). This tool asks students to draw a scientist or engineer, write a brief description of their drawing and answer several likert-scale items around what scientists and engineers do. . In partnership with a local interactive science center, an elementary school, and an afterschool program, we facilitated the Draw an Engineer activity along with the Likert-style interest survey as a pre- and post-assessment to 65 4th and 5th grade students. For this study, we looked at the 12 item polytomous survey. Preliminary item response analysis using a Rasch model indicated potential issues surrounding student understanding of Likert scale items and complications with the survey wording and format. This work in progress study deeper examines how elementary-aged students understand Likert scale survey items and what can be done to improve the Draw an Engineer survey for future uses of the tool.

Themes: Item Response Analysis, Likert Scales, Science Education

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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*Taiwanese American Heritage Language Speakers' Voicing Practices and Identity*

Huay Chen (she/her)

Session #5 - Identity and Representation in Education (Saturday, May 15, 2021 - 10:10 am)

Abstract: Chinese (Mandarin) heritage language (HL) speakers and learners have been studied in various ways, including their experiences attending Chinese school and their parents' attempts to maintain their children's HL. This study focuses on voicing, a language practice that speakers use to signify the identity that is associated with a given voice. Through twenty interviews with Taiwanese American college-aged students, I will investigate how Taiwanese American Mandarin speakers show their multicultural identity in voicing the accents of different types of speakers. I will argue that while this is not always an intentional choice, the situations in which the voicing occurs reaffirm the relationship between the speaker and interlocutor. Additionally, I plan to receive naturally occurring conversational data from a subset of my participants in order to build on the ideas that the participants share in their interviews.

Themes: Heritage Language Speakers/Learners, Sociolinguistics, Identity

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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### *Transfer Students' Self-Regulation in Routine and Non-Routine Proofs*

Royce Olarte (he/his), Sarah A. Roberts, Hani Pajela, and Damaris Hernandez  
Session #2B - STEM Education (Friday, May 14, 2021 - 11:30 am)

Abstract: Proof-construction and comprehension are important skills that undergraduate mathematics students need to develop as they transition to upper-division courses. While research on proof-construction has grown in the last few decades, there is still limited work on exploring how students engage with proofs through a metacognitive lens and how transfer students engage with this work. This study examined how transfer mathematics students engaged in self-regulatory activities while performing routine and non-routine proofs. We used Zimmerman's model of self-regulated learning (SRL) theory, which emphasized the sequential, cyclic nature of self-regulation feedback loops in learning and task performances to better understand the difficulties students faced with proof-construction. Two transfer student participants participated in think aloud interviews, solving a routine and non-routine number theory proof. Engaging students in routine and non-routine proofs allowed us to observe their self-regulatory activities in contexts with varying cognitive demands. Using qualitative data analysis, we found that students engaged in fewer cycles of self-regulation during the routine proofs in comparison to the non-routine proofs. Moreover, in routine proofs, students engaged in a limited number of strategies, exhibited more procedural performance, and had more implicit self-reactions. On the other hand, self-regulation in non-routine proofs involved a broader range of strategies and interpretations, fewer systematic performances, and more negative self-reactions. A better understanding of transfer students' self-regulation in proofs illuminates some of the challenges associated with this crucial junction in students' transition to upper-division coursework. This research can inform practices that better support students' proof-constructions, but more importantly can help us better attend to transfer students and their success in continuing as mathematics majors.

Themes: Undergraduate Mathematics Education, Metacognition, Problem-Solving/Proof-Writing

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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*Undergraduate considerations when selecting a major to study at a four-year institution*

Claire Chen (she/her), Alexandria Muller (she/her), Devon M. Chrisman (she/her), and  
Diana Arya (she/they)

Session #4B - Higher Education (Saturday, May 15, 2021 - 9:00 am)

Abstract: Choosing a college major can be a difficult task for many undergraduate students upon entering higher education as there are many factors that can influence this decision such as interest in the subject, familial pressures, and career goals. Studies have shown that around 30% of undergraduate students change their major at least once within three years of enrollment (NCES, 2017), often citing positive reasons related to their new majors, such as an increased alignment with interests or career goals (Malgwi, Howe, & Burnaby, 2005). We are interested in understanding the factors that undergraduate students consider when selecting their major upon entering a four-year higher education program, and how these initial selections influence subsequent changes in major. For this study, we looked at 11 written surveys and 3 interviews with undergraduate students who were enrolled in an upper division service learning course at a university in central California. Informants reflected upon their initial major choices and described any subsequent changes in their majors. Using emergent thematic coding, we identified key factors in the major selection process and any subsequent changes in major selection. This poster will highlight key factors that influenced undergraduate students as they navigated their choice of major during their higher education experience. This may be useful for understanding how to better support undergraduate students when selecting a major that is right for them.

Themes: Undergraduate Majors, Higher Education, Qualitative Analysis

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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*Utilizing Counter Narratives for Student Investigative Learning*

Cameron Dexter Torti (he/him/his)

Session #6B - Teacher Education and Beliefs (Saturday, May 15, 2021 - 11:40 am)

Abstract: Through a research project in a Central Texas middle school, it was identified the mis- and underrepresentation of Communities of Color caused students from minoritized populations to feel less empowered in their education. As a result, counter narratives were included in instructional activities during their Texas History coursework. This presentation aims to provide a background on the overarching idea of counter narratives being utilized in instructional activities, how counter narratives help build and expand students' perspectives of themselves and become more critical consumers, and provide some examples of how they may be implemented in class settings.

Themes: Equity in Education, Social Studies Education, Student Empowerment

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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*Who Am I Now: Looking at Undergraduate's Self-Perceived Identity During the COVID-19 Pandemic*

Nathalie Paesler (she/her), Alexandria Muller (she/her), Devon M. Chrisman (she/her), and  
Diana Arya (she/her)

Session #1 - COVID and Education (Friday, May 14, 2021 - 10:00 am)

Abstract: COVID-19 has caused numerous changes in the lives of individuals around the world, especially for undergraduate students in the United States, who have had to leave their universities, adapt to online schooling, and undertake all the precautions required by COVID-19. Recent studies looking at undergraduate student's mental health in the United States found that during the COVID-19 pandemic, students report an increase in anxiety and stress (Wang, 2021). However, studies that have attempted to understand the undergraduate experience during the time of COVID-19 have focused on a mental health perspective, specifically relating to anxiety, depression, and stress. This study will instead attempt to construct a preliminary understanding of undergraduates' lived experiences and self-identity in the midst of a global epidemic, through the use of art pieces. Art will be used, as it will give undergraduates the chance to explore a wider variety of feelings and themes they have experienced during the COVID-19 pandemic than a survey would allow. This study will investigate the experiences of undergraduates at the University of California, Santa Barbara. Participants will be sent an art kit, and will then create a piece reflecting their identity, specifically relating to their position as an undergraduate student, during the COVID-19 pandemic. Photos of the art pieces will then be collected, and participants will be interviewed, so that they can explain their work and it's meaning to them. The art pieces and the interviews will then be analyzed using multi-modal discourse analysis and critical discourse analysis to reveal themes within undergraduate's identities during this time. Emergent coding will also be used, if clear common themes arise in multiple participant's works. Following analysis of the art pieces and interviews, the work will be member-checked by participants to ensure proper interpretation occurred.

Themes: Undergraduate Identity, COVID-19

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# ABSTRACT CATALOG

## PRESENTATIONS LISTED IN ALPHABETICAL ORDER BY TITLE

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### *Youth Perceptions of Authors and Scientists in an Afterschool Program*

Kassandra Ortega (she/her), Alexandria Muller (she/her), Devon M. Chrisman (she/her),  
and Diana Arya (she/they)

Session #5 - Identity and Representation in Education (Saturday, May 15, 2021 - 10:10  
am)

Abstract: Supporting women and non-binary persons' pursuit of careers in STEM and authorship is crucial for diversifying these historically male-dominated professions. Many programs designed to increase interest in STEM and writing, however, focus on high school or college students which is far too late (Tai et al., 2006). The STEMInist Project has been actively taking steps to encourage an interest in STEM and writing for girls and non-binary youth (ages 8-12) by fostering connections with female scientists and engineers at a university in central California. Youth participants met, interviewed and participated in hands-on STEM activities with university scientists over the course of 10 weeks. They then reflected upon their experiences and collaboratively published scientist highlights in a book intended for youth. This study aims to understand how girls and non-binary youths' perceptions of scientists and writers transform after participating in The STEMInist Project. Using pre- and post-program interviews of youth from the 2017-2018 cohort (n=27), we identified emergent themes centered around youth perceptions of STEM and literacy, and identity as scientists and authors. Research shows that both STEM and literacy-based programs do have a positive effect on transforming youth perceptions about scientists and authors, while developing self-efficacy as scientists and authors themselves (Brown, Morrell, & Rowlands, 2011). This poster will expand upon these findings and discuss how girls and non-binary youth's perceptions of and identity as scientists and authors shifted.

Themes: STEM-based Programming, Literacy Programming, Identity/Self-efficacy

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