Program Draft updated 21 February 2022

This draft program only contains the concurrent sessions, which includes poster and roundtable sessions. It does not include pre-conference workshops, welcome and keynote general sessions, or networking events.

Please refer to the Schedule at a Glance, which lists the general sessions and other functions.

3/27/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions
SC-organized paper set-Middle School & NGSS Science Teaching & Learning
3:00 PM-4:30 PM, Parq Salon A
Presider:

A Longitudinal Study of Middle School Students' Science Task Values
Sufen Chen, Graduate Institute of Digital Learning and Education & Teacher Education Center, National Taiwan University of Science and Technology, Taiwan
Ssu-Ching Huang, Graduate Institute of Digital Learning and Education, National Taiwan University of Science and Technology, Taiwan
Pey-Yan Liou, Department of Education, Korea University, Korea

An Exploratory Study to Develop a Framework of Middle School Science Giftedness in NGSS Era
Shari E. Hiltbrand, Texas Tech University
Mihwa Park, Texas Tech University

Examining Middle School Teacher Implementation and Enactment of the NGSS: A Mixed Methods Study
Erik Arevalo, University of California, Santa Barbara
Meghan Macias, University of California, Santa Barbara
Katy Nilsen, WestEd
Ashley Iveland, WestEd

Examining NGSS Scientific Practices in K-12 Science Classrooms (Virtual)
Peter Hu, University of Pittsburgh
Ling L. Liang, La Salle University
Ying-Chih Chen, Arizona State University
Takeshi Terada

3/27/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Admin Symposium-A community of practice contextualized within sociocultural phenomena: Mitigating teaching and learning of STEM through counter-praxis
3:00 PM-4:30 PM, Parq Salon B

Panelists
Angela M Chapman, University Of Texas Rio Grande Valley
Ariana Garza Garcia
Felicia Rodriguez
Anthony Bailey
Juan B. Lazo
Alejandro J. Gallard, Georgia Southern University

3/27/22

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies
SC-organized paper set-Diverse Opportunities for Early Science and Engineering Experiences
3:00 PM-4:30 PM, Parq Salon C
Presider:

A Mixed Methods Study of Serious Game Design Heuristics that Support Elementary Science Learners
Georgia W Hodges, University of Georgia
Kayla P Flanagan, University of Georgia
Stephanie Eldridge, University of Georgia
Joanna Schneider , University of Georgia
Allan Cohen, University of Georgia
Juyeon Leet

Temperature Measurement with Early Elementary Students
Ryan Cain, Weber State University
Victor R Lee, Stanford University

Inspiring Learning Environments—What Preschoolers' Prefer? Do Enriched Environments Enhance Engineering Capabilities? Does Gender Matter? (Virtual)
Ornit Spektor-Levy, Bar-Ilan University
Netta Perry, Bar Ilan University
Taly Shechter, Bar Ilan University

3/27/22

Strand 5: College Science Teaching and Learning (Grades 13-20)
Related Paper Set-The Missing Materials in College Science Learning: Intersections of Materiality, Agency, and Disciplinary Inquiry (Virtual)
3:00 PM-4:30 PM, Kitsilano Ballroom A
Discussant: Timothy Atherton, Tufts University
Presider: Brian E Gravel, Tufts University

Using Conjecture Mapping to Uncover Sociomaterial Entanglements in Introductory Physics Labs (Virtual)
Ian Descamps, Tufts University

Leveraging Material Uncertainty to Support Students' Trajectories of Practice (Virtual)
Robert D. Hayes, Tufts University
Julia Gouvea, Tufts University
Aditi Wagh, Massachusetts Institute of Technology

Curating Materials for Epistemic Agency (Virtual)
Leslie Atkins Elliott, Boise State University
Shakayla Moran, Boise State University

Developing Disciplinary Relationships in Computational Physics (Virtual)
Ezra Gouvea, Tufts University
Brian E Gravel, Tufts University
Timothy Atherton, Tufts University

3/27/22

Strand 6: Science Learning in Informal Contexts
SC-organized paper set-Emerging research in Informal Science
3:00 PM-4:30 PM, Kitsilano Ballroom B
Presider: Stephanie Teeter, NC State University

Examining the Nature of Canada's Scientific Literacy Through COVID-19 Tweets
Samantha Jewett, University of Western Ontario
Anton Puvirajah, University of Western Ontario
Mohammad Azzam, Western University
Jingrui Jiang, University of Western Ontario

Native Animals, Native Knowledge? An analysis of zoo portrayal of Indigenous Cultures
Jonathan R Bowers, Michigan State University
Gail Richmond, Michigan State University

The Portuguese Maritime Voyages: the exploration of the history of a city with an App (Virtual)
Cláudia Faria, Instituto De Educação Da Universidade De Lisboa
Elsa Guilherme, Instituto de Educação da Universidade de Lisboa
Joaquim Pintassilgo, Instituto de Educação da Universidade de Lisboa
Maria João Mogarro, Instituto de Educação da Universidade de Lisboa
Ana Sofia Pinho, Instituto de Educação da Universidade de Lisboa
Mónica Baptista, Instituto de Educação da Universidade de Lisboa
Isabel Chagas, Instituto de Educação da Universidade de Lisboa
Cecília Galvão, Instituto de Educação da Universidade de Lisboa

3/27/22

Strand 7: Pre-service Science Teacher Education
Symposium-Building an Elementary Science Teacher Education Community to Advance Equity and Justice
3:00 PM-4:30 PM, Cambie
Discussant: Felicia Mensah, Teachers College, Columbia University
Presider: Christa Haverly, Northwestern University,

Panelists
Christa Haverly, Northwestern University
Terrance Burgess, Michigan State University
Marti Canipe, Northern Arizona University
Tina Cheuk, California Polytechnic State University
Judith A. Cooper-Wagoner, University of Arizona
Amal Ibourk, Florida State University
Thomas J McKenna, Boston University
Meenakshi Sharma, Mercer University
Christina V. Schwarz, Michigan State University
Felicia Moore Mensah, Teachers College, Columbia University
Elizabeth A. Davis, University of Michigan
Kristin Gunckel, University of Arizona

3/27/22

Strand 7: Pre-service Science Teacher Education
SC-organized paper set-Exploring challenges of PCK development in pre-service teacher education
3:00 PM-4:30 PM, Granville I
Presider: Stephen L. Thompson, University of South Carolina,

Catalyst or Catastrophe: Examining the Influence of the edTPA on Preservice Science Teachers' PCK Development (Virtual)
Matt Reynolds, North Carolina State University
Soonhye Park, North Carolina State University

Examining elementary pre-service teachers' competence of questioning in leveraging students' conceptual understanding (Virtual)
Jianlan Wang, Texas Tech University
Yuanhua Wang, West Virginia University
Yanhong Guo, Texas Tech University
Shawn Kashef, University of Georgia

Examining Pre-Service Physics Teachers' Pedagogical Content Knowledge – A Sequence of Proficiency Levels
Dustin Schiering, IPN – Leibniz Institute for Science and Mathematics Education, Kiel, Germany
Stefan Sorge, IPN – Leibniz Institute for Science and Mathematics Education, Kiel, Germany
Melanie Keller, IPN – Leibniz Institute for Science and Mathematics Education, Kiel, Germany
Knut Neumann, IPN – Leibniz Institute for Science and Mathematics Education, Kiel, Germany

3/27/22

Strand 10: Curriculum and Assessment
Related Paper Set-Bringing researcher perspectives and research-based approaches to the design of instructional materials for broad use
3:00 PM-4:30 PM, Burrard
Discussant: Brian Reiser, Northwestern University
Presider: Daniel C. Edelson, BSCS Science Learning,

Bringing a Science Education Research Perspective to the Development of Instructional Materials for Broad Use
Daniel C. Edelson, BSCS Science Learning
Brian J. Reiser, Northwestern University
Katherine L. McNeill, Boston College
William R. Penuel, University of Colorado
Shelly LaDoux, The Dana Center

Addressing Tensions Inherent in Using Student Surveys to Make Equitable Decisions about Phenomenon Selection
Zoe E. Buck Bracey, BSCS
Lindsey Mohan, BSCS Science Learning
Jamie D Noll, Northwestern University

Designing middle school science curricula 'by states, for states'
Audrey Mohan, BSCS Science Learning
Michael J. Novak, Northwestern University
Shafiq Chaudhary, New Mexico Public Education Department
Hillary Paul Metcalf, Massachusetts Department of Elementary and Secondary Education

3/27/22

Strand 11: Cultural, Social, and Gender Issues
Symposium-Analytic Approaches to Studying Identity Work Longitudinally
3:00 PM-4:30 PM, Parq Salon D (livestream 1)
Discussant: Allison Gonsalves, McGill University
Presider: Alison Mercier, University of Wyoming,

Panelists
Alison Mercier, University of Wyoming
David Segura, Beloit College
Zahra Hazari, Florida International University
Heidi B. Carlone, Vanderbilt University
Edna Tan, University Of North Carolina At Greensboro
Lucy Avraamidou, University Of Groningen
Robert H. Tai, University Of Virginia
Louise Archer, UCL Institute of Education
Henriette T. Holmegaard, University Of Copenhagen
Bryan A. Brown, Stanford University
Maria Varelas, University of Illinois Chicago
Daniel Morales-Doyle, University of Illinois Chicago
Geoff Potvin, Florida International University
Pooneh Sabouri, Florida International University
Thomas Head, Florida International University
Joinee Taylor, Florida International University
Benjamin Archibeque, Florida International University
Aerin Benavides, University of North Carolina at Greensboro
Julie Moote, UCL Institute of Education
Katia Bill Nielson, University of Copenhagen
Ene Hoppe, University of Copenhagen

3/27/22

Strand 11: Cultural, Social, and Gender Issues
SC-organized paper set-Belonging and Retention in Postsecondary STEM
3:00 PM-4:30 PM, Stanley
Presider: Ene Ernst Hoppe, University of Copenhagen,

Retaining Underrepresented Minorities in STEM Majors: The Role of Mentoring in the First Year
Stacy Olitsky, Saint Joseph's University

What is the Science when Talking Science Identity? Reflections from a Higher Education Biology Perspective.
Katerina P. Günter, Centre for Gender Research, Uppsala University, Uppsala, Sweden
Carolina De Barros Vidor, Department of Education, Uppsala University, Uppsala, Sweden
Annica Gullberg, Teaching in STEM, KTH, Royal Institute of Technology, Stockholm, Sweden

Building Bridges: An Intervention to Improve Academic Outcomes for Underrepresented "Minority" Students in General Chemistry
Natasha H. Johnson, University of Toledo

Hands-On Learning About Inclusion in an Undergraduate Physics Lab (Virtual)
Kim-Alessandro Weber, Leibniz Universitaet Hannover, Institute for Mathematics and Physics Education
Rüdiger Scholz, Leibniz Universitaet Hannover, Institut fuer Quantenoptik
Gunnar Friege, Leibniz Universitaet Hannover, Institute for Mathematics and Physics Education

3/27/22

Strand 12: Technology for Teaching, Learning, and Research
SC-organized paper set-Using Representations, Data, and Graphing to Support Concept Development
3:00 PM-4:30 PM, Kitsilano Ballroom C
Presider: Catherine Quinlan, Howard University, School of Education,

Supporting middle school students to integrate graph data with physical science content
Phillip A. Boda, University of California, Berkeley
Emily Harrison, University of California, Berkeley
Marcia C. Linn, University of California-Berkeley

Applying visual highlighting techniques to support students' understanding in Organic chemistry (Virtual)
Nicole Graulich, Justus-Liebig Universität Giessen
Marc Rodemer, IPN Kiel
Julia Eckhard, Justus-Liebig-University Giessen
Sascha Bernholt, IPN Kiel

The Role of Individual Differences in Working Memory Capacity When Comprehending Visualizations With Relative Data and Seductive Details (Virtual)
Kristine A. Antonyan, University of Florida
Poorya M. Shidfar, University of Florida
Do Hyong Koh, University of Florida
Pavlo D. Antonenko, University Of Florida

Will CTCA Help Students' Understanding of Difficult Concepts In Computer Studies?
Mariyam Pentho Abdulhadi, ACEITSE-Lagos State University
Peter A. Okebukola, ACEITSE-Lagos State University
Fred Awaah, University of Professional Studies Accra
Adekunle Ibrahim Oladejo, ACEITSE – Lagos State University
Deborah Oluwatosin Agbanimu, ACEITSE-Lagos State University

3/27/22

Strand 14: Environmental Education and Sustainability
SC-organized paper set-Exploring literacies in environmental education and education for sustainable development
3:00 PM-4:30 PM, Granville II
Presider: Jean-Philippe Ayotte-Beaudet, Université De Sherbrooke,

A systematic literature review: assessing sustainability literacy
Rolf Saarna, University of Tartu
Anne Laius, University of Tartu

Creative and Digital Pedagogies for Teaching Ocean Literacy: The Ocean Connections Project
Lindsay Hetherington, University of Exeter
Justin S Dillon, University of Exeter
Birgitte Lund Nielsen, VIA University College
Harald Brandt, VIA University College
Maria MJ Malmierca, CESGA

Equipping the Young to Tackle Current Societal Challenges
Giulia Tasquier, University of Bologna
Erik Knain, University of Oslo
Alfredo Jornet, University of Oslo

Fostering Environmental Literacy through Engagement in Self-Regulation Learning Processes
Michal Zion, Bar Ilan University, School of education
Guly Ortal-Ivry, Bar Ilan University, School of education
idit Adler, Tel Aviv University, School of Education

3/27/22

Research Committee
Admin Symposium-Global Perspectives from the Handbook of Research on Science Education, Volume III
3:00 PM-4:30 PM, Parq Salon E (livestream 2)
Presider: Dana L Zeidler, University of South Florida, Judith S Lederman, Illinois Institute of Technology

Introduction and Overview
Dana L Zeidler, University of South Florida
Judith S Lederman, Illinois Institute of Technology
Norman G Lederman, Illinois Institute of Technology

Section I. Theory and Methods of Science Education Research

Section II. Science Learning

Section III. Diversity and Equity in Science Learning

Section IV. Science Teaching

Section V. Curriculum and Assessment in Science

Section VI. Science Teacher Education

3/27/22

Admin Symposium-Graduate Student Research Symposium
3:00 PM-4:30 PM, Kitsilano Ballroom D

The graduate students research symposium is for the up-and-coming scholars sharing their work-in-progress studies as they develop their research capacity while working with a mentor. Attendees are encouraged to attend and share inputs with our presenters.

Searching for understanding: How do NOS and science identity intersect for HS students?
Robert Bennett, Georgia State University,

Environmental Service-Learning as University-Community Partnership: Using actor-network theory to examine a new model of engagement
Hannah Cooke, University of Connecticut

Minoritized, Secondary Students and Risk-Taking in STEM Classrooms
Danielle Daniels, University of Rochester

Modeling water quality scientists' participation in science communication
Brenda Guerrero, Florida International University

Exploration of Secondary Science Teacher Candidates' Ideological Shifts in an Initial Teacher Preparation Program
Claudia Hagan, Georgia State University

The Lived Experiences of Graduate and Early Career Black Women in STEM Academia
Lisa Hanson, Middle Tennessee State University

Science Instructors' New Approaches to Teaching During the COVID-19 Pandemic
Olena James, Middle Tennessee State University

Investigating the Experiences of Preservice Teachers of Color in a STEM Focused Teacher Education Program at a Historically White Institution
Victor Kásper, Florida State University

Lessons Learnt from Designing an SDG STEM Club to Increase Awareness about SDGs Among Canadian Youth
Midhat Noor Kiyani, McGill University

Developing and Using Models as Assessments to Inform the Teaching Progression in the Science Classroom
Kristin Mansell, Texas Tech University

Designing for Axiological Engagement: Manifesting Implicit Power Relationships in STEM Research through Embodied Play

Sophia Marlow, University of Calgary

How Science Identities are Formed by Recognition?: Exploring Bangladeshi Women Science Teachers' Challenges and Aspirations
Shamnaz Arifin Mim, McGill University

Collaborating S-T-E-M In-Service Teachers Developing Integrated STEM Teaching
Argyris Nipyrakis, University of Groningen & University of Crete

Black Students' Access to STEM Undergraduate Studies via Transitional Education
ProgramsNadia Qureshi, OISE, University of Toronto

Exploring the Coordination of Secondary Science Teachers' Resources Across Their Resource Systems
David Schouweiler, The University of North Carolina at Greensboro

Student Centered Science Classrooms: Dilemmas Faced While Teaching Science Through a Global Pandemic
Jennifer Slavick, West Chester University

Failure and Creativity: The Case to Embrace Both in STEM Education
Elizabeth Stretch, University of Minnesota

Researching race and experience in postsecondary STEM education at a Western Canadian University
Kristal Turner, University of Calgary

Exploring pre-service science teachers' attitudes and beliefs towards gender and sexual diversity-inclusive science teaching
Gary Wright, North Carolina State University

The Figured World of the Introduction of a Justice-Centered Secondary Science Education Program
Yang Zhang, University of Rochester

3/27/22

Multi-Strand-*Virtual Session A*
3:00 PM-4:30 PM, Parq Salon F (livestream 3)

Teaching and Learning Floating and Sinking: a Metaanalysis (Virtual)
Martin Schwichow, PH Freiburg
Anastasios Zoupidis, Democritus University of Thrace

How Do Students Make Sense of Simultaneous Synthesis Physics Tasks? (Virtual)
Bashirah Ibrahim, Bahrain Teachers College, University of Bahrain
Lin Ding, Ohio State University

Pedagogy in practice: exploring the use of pedagogy course knowledge by learning assistants (Virtual)
Vera Degtiareva, Boston University
Emily C. Allen, Boston University
Andrew Duffy, Boston University
Manher Jariwala, Boston University

Physics Education Curriculum from the decoloniality lens: a Brazilian case study (Virtual)
Carlos Mometti, University of São Paulo
Tanja Tajmel, Concordia University
Mauricio Pietrocola, University of São Paulo

3/27/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions
SC-organized paper set-Middle School Science Teaching & Learning
4:45 PM-6:15 PM, Parq Salon A
Presider:

An Investigation of Teaching and Learning Approaches Influencing Students' Intrinsic Motivation towards Science Learning: A Longitudinal Analysis from Grade 6 to 9
Moonika Teppo, University Of Tartu
Regina Soobard, University Of Tartu
Miia Rannikmae, University Of Tartu

Exploring Student- and Teacher-Level Characteristics on Middle School Students' Engagement in Life Science Classes
Zeynep Gonca Akdemir, Purdue University
Muhsin Menekse, Purdue University
Selcen Guzey, Purdue University

Teaching and Learning Kinematics: A Comparison of two Approaches
Gunnar Friege, University of Hannover Physics Education Group
Ingmar Schneider, University of Hannover Physics Education Group

The Effect of Multi-Faceted Holistic Approach in Science Instruction on Students' Achievements, Preferences, and Needs
Oshra Aloni, Bar-ilan University
Michal Zion, Bar-Ilan University
Ornit Spektor-Levy, Bar-Ilan University

3/27/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Related Paper Set-Students and teachers' challenges explaining the mechanism of complex systems and suggestions to address them
4:45 PM-6:15 PM, Parq Salon B
Presider:

Using concept maps to evaluate preservice biology teachers' conceptualization of Covid-19 as a complex phenomenon
Tom Bielik, Freie Universität Berlin
Moritz Krell, Freie Universität Berlin
Johannes Jageman
Dirk Krueger, Freie Universitaet Berlin
Orit Ben Zvi Assaraf, Ben-Gurion University Of the Negev, Israel

Developing a Coherent Understanding of Biology Through a Complex Systems Lens
Susan Yoon, University of Pennsylvania
Katherine Miller, University of Pennsylvania

Leveraging causal heuristics to scaffold student understanding in dynamic system models
Lynn Stephens, The Concord Consortium
Steve Roderick , The Concord Consortium

Comparing how students' conceptual understanding and computational model explain system mechanisms in time-based phenomena (Virtual)
Emil Eidin, Michigan State University
Jonathan Bowers, Michigan State University

3/27/22

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies
SC-organized paper set-Professional Development of Science Teachers
4:45 PM-6:15 PM, Parq Salon D (livestream 1)
Presider: Selina L. Bartels, Valparaiso University,

Empirically Grounding a Learning Performances Framework for K-5 Students' Modeling Competency Using Evidence-Centered Design
Florian Böschl, University of Leipzig
Tina Vo, University of Nevada- Las Vegas
Cory T. Forbes, University of Texas Arlington
Kim Lange-Schubert, University of Leipzig

Learning to Care for Students as Science Sensemakers: Preservice Elementary Teachers' Noticing and Epistemic Empathy
Ruveyde A. Kaya, Florida State University
Jennifer Schellinger, FSU
Sherry A. Southerland, Florida State University
Kirby Whittington, The University of Utah
Samantha Skrob-Martin, Florida State University

The Role of Responsibilist Intellectual Virtues in Science Learning
Ronald W Rinehart, University of Northern Iowa
Mason Kuhn, University of Northern Iowa
Todd Milford, University of Victoria

Utilizing lesson study to lay the foundation for preservice teachers to begin shaping elementary students' scientific literacy
Selina L. Bartels, Valparaiso University

3/27/22

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
SC-organized paper set-Science teaching practices in secondary content areas
4:45 PM-6:15 PM, Parq Salon C
Presider:

Assessment of chemistry teacher student's diagnostic competencies in the Simulated Chemistry Classroom (SiCC).
Sascha Wittchen, Freie Universität Berlin
Claus Bolte, Freie Universität Berlin
Nils Machts, Christian-Albrechts-Universität zu Kiel

Capturing a Teacher's Multidimensional and Dynamic Attention to Student Learning in Design-Based Chemistry Education
Hanna Stammes, Delft University of Technology & Radboud University
Ineke Henze, Radboud University
Marc de Vries, Delft University of Technology
Erik Barendsen, Radboud University & Open University

Examining the Relative Effectiveness of CTCA in Improving Secondary School Students' Achievement in Genetics
Israel O. Adebayo, ACEITSE-Lagos State University
Peter A. Okebukola, ACEITSE-Lagos State University
Adekunle I. Oladejo, ACEITSE-Lagos State University

I am CTCA, and this is my first Attempt in the Physics Class - How Will I perform? (Virtual)
Adekunle Ibrahim Oladejo, ACEITSE-Lagos State University
Peter A. Okebukola, ACEITSE-Lagos State University
Israel Oludotun Adebayo, ACEITSE-Lagos State University
Gabriel Korede Adeosun, ACEITSE-Lagos State University
Deborah Oluwatosin Agbanimu, ACEITSE-Lagos State University
Franklin U. Onowugbeda, ACEITSE-Lagos State University
Ibukunolu Adebiyi Ademola, ACEITSE-Lagos State University
Esther Oluwafunmilayo Peter, ACEITSE-Lagos State University
Olasunkanmi Adio Gbeleyi, ACEITSE-Lagos State University
Fred Awaah, University of Professional Studies Accra

3/27/22

Strand 6: Science Learning in Informal Contexts
SC-organized paper set-Engaging youth in STEM through informal learning experiences
4:45 PM-6:15 PM, Kitsilano Ballroom B
Presider: Laura Dell, University of Cincinnati,

A meta-synthesis on the impact of informal STEM programs on STEM major and STEM career awareness, interest, and engagement
Bobby Habig, American Museum of Natural History
Preeti Gupta, American Museum of Natural History
Jennifer Adams, University Of Calgary
Mandë Holford, Hunter College

Enhancing Gifted Students' Attitudes toward STEM: An Insight from a Research Apprenticeship Program (Virtual)
Shuchen Guo, Nanjing Normal University
Enshan Liu, Beijing Normal University
Cheng Liu, Beijing Normal University
Hailan Wang, Xiangyang No. 5 Middle School

Youth Science Identity and Perspectives of Scientists after Participation in a STEM-based Afterschool Program (Virtual)
Devon M Christman, University of California, Santa Barbara
Kassandra Ortega, University of California, Santa Barbara
Nathalie Paesler, University of California, Santa Barbara
Alexandria Muller, University of California- Santa Barbara
Diana J Arya, University of California, Santa Barbara

3/27/22

Strand 7: Pre-service Science Teacher Education
SC-organized paper set-Centering social justice in science teacher education
4:45 PM-6:15 PM, Kitsilano Ballroom A
Presider:

"Kinda awful.I spent a lot of time crying":Attending to the Emotions of PSTs of Color
Victor Kásper, Florida State University
Shannon G. Davidson, Florida State University
Lama Jaber, Florida State University

Learning Antiracist and Socially Just STEM Teaching Within an Embedded, Place-Based Model of Teacher Education (Virtual)
Rachael M. Gordon, University of Michigan

STEM Education through Abolitionist Teaching: A Research-Practice Partnership to Support Virtual Microteaching Experiences
Vanessa Grady, Georgia State University
Natalie S. King, Georgia State University

3/27/22

Strand 7: Pre-service Science Teacher Education
SC-organized paper set-Cultivating positive dispositions toward science teaching
4:45 PM-6:15 PM, Granville I
Presider: Lezly Taylor, Virginia Polytechnic Institute and State University,

Attitudes of Preservice Elementary Science Teachers toward iSTEM Teaching: The Role of Adaptive Expertise (Virtual)
Mounir R. Saleh, Bahrain Teachers College, University of Bahrain
Bashirah Ibrahim, Bahrain Teachers College, University of Bahrain

Preservice Science Teachers' Implementation and Self-Efficacy About The Science And Engineering Practices (Virtual)
Fatma Kaya, Middle Tennessee State University
Lisa A. Borgerding, Kent State University
Shannon Navy, Kent State University

Systematic Assessment of Future Primary School Teachers' Interests in Science
Steffen Wagner, Humboldt-Universität zu Berlin
Burkhard Priemer, Humboldt-Universität zu Berlin
Doris Lewalter, Technical University Munich

3/27/22

Strand 8: In-service Science Teacher Education
SC-organized paper set-Impact of Unique Professional Development Foci
4:45 PM-6:15 PM, Granville II
Presider: Avraham Merzel, The Hebrew University of Jerusalem,

Changes in Teacher Thinking about Enactment Influenced by a PD about an NGSS-Aligned Storyline Unit
Nessrine Machaka, University of Illinois At Urbana - Champaign
Stina Krist, University of Illinois at Urbana-Champaign

Creating Unity and Inclusion Through Developing the Research Team Teacher Role
Aline Gjelaj, Dual Language Middle School, New York, NY
Jessica White, Benjamin Syms Middle School, Hampton, VA.
Elaine V Howes, American Museum of Natural History
Jamie Wallace, American Museum of Natural History
Elizabeth Edmondson, Virginia Commonwealth University

The enactment of professional development principles in a collaborative project between science and RE teachers
Ann Childs, University of Oxford
Liam Guilfoyle, University of Oxford

3/27/22

Strand 10: Curriculum and Assessment
Related Paper Set-Engaging with Curricular Infrastructure to Support Elementary Science Teacher Learning and Identity Development
4:45 PM-6:15 PM, Cambie
Presider: Christa Haverly, Northwestern University,

Curriculum Materials Adoption Processes: Teacher Learning in an Organizational Routine
Christa Haverly, Northwestern University
Emily Rose Seeber, University of Michigan
Elizabeth A. Davis, University of Michigan
James P Spillane, Northwestern University
Angela Lyle, University of Michigan

Supporting Early Elementary Science and Literacy Teaching: The Synergy of Pedagogical Tools
Amelia Wenk Gotwals, Michigan State University
Amber S. Bismack, Oakland University
Samantha Danzinger
Arianna Pikus, Michigan State Univsersity
Tanya S Wright, Michigan State University
Miranda S. Fitzgerald, University of North Carolina At Charlotte

Collaborative Development of Tools to Address Content-Practice Tensions in Classroom Science Investigations
Eve Manz, Boston University School of Education
Chris Georgen, Boston University
Betsy Beckert

Supporting Elementary Teachers in Enacting Curricular Reform and Reform-based Science Instruction
Christina Siry, University Of Luxembourg
Sara E. Wilmes, University of Luxembourg
Kerstin Te Heesen, University of Luxembourg

3/27/22

Strand 11: Cultural, Social, and Gender Issues
SC-organized paper set-Black STEM Professionals and STEM Teaching, Learning, and Engagement
4:45 PM-6:15 PM, Stanley
Presider:

Centering Black Scientists' Lived Experiences : A Context for Culturally and Linguistically Embedded Science
Gillian U Bayne, Lehman College of the City University of New Yorkl

Mentorship to Combat Loneliness, Bridge Opportunity Gaps, and Fight Underrepresentation in STEM Disciplines
Veeshan Narinesingh, Department of Physics The Graduate Center of The City University of New York
Farrah Simpson, Department of Physics Brown University
Tracy Edwards, Department of Physics Michigan State University
Milena Chakraverti-Wuerthwein, The Harlem Gallery of Science

Exploring Racism in the Undergraduate and Graduate School Choices of Scientists and Engineers: Counterspaces for Black men in S&E (Virtual)
Shari Watkins, American University
Brian McGowan, American University

3/27/22

Strand 12: Technology for Teaching, Learning, and Research
Symposium-Applying epistemic heuristics to characterize student reasoning about mechanisms with computational tools
4:45 PM-6:15 PM, Burrard
Discussant: Christina Krist, University of Illinios, Urbana Champagne
Presider: Elon Langbeheim, Ben-Gurion University of the Negev, Israel,

Reasoning about interactions when constructing mechanistic explanations (Virtual)
Michal Haskel-Ittah, Weizmann Institute of Science, Israel
Rami Marelly, Weizmann Institute of Science, Israel
Smadar Szekely, Weizmann Institute of Science, Israel

Reasoning about clogging in crowd evacuation through bottlenecks
Elon Langbeheim, Ben-Gurion University of the Negev, Israel
Shani Ben-Hamo, Ben-Gurion University of the Negev, Israel
Stav Shapira, Ben-Gurion University of the Negev, Israel

Student Use of Epistemic Heuristics at the Intersection of Science and Social Justice
Allison Bradford, University of California, Berkeley
Libby Gerard, University of California, Berkeley
Marcia Linn, University of California, Berkeley

Reasoning about heat transfer while examining the relationships between physical experiment and computer model (Virtual)
Tamar Fuhrmann, Stanford University
Carmel Bar, Weizmann Institute of Science, Israel
Paulo Blikstein, Teachers College, Columbia University

3/27/22

Strand 14: Environmental Education and Sustainability
SC-organized paper set-Innovative approaches in environmental science education
4:45 PM-6:15 PM, Kitsilano Ballroom C
Presider: K. C. Busch, North Carolina State University,

[Program Name]: Powering the Science Learning Process with Co-Created Citizen Science
Ruth Kermish-Allen, Maine Mathematics and Science Alliance
Alexandria Brasili, Maine Mathematics and Science Alliance

Assessing Elementary Students Ability to Make Informal Observations About Living Organisms Outdoors
Jean-Philippe Ayotte-Beaudet, Université De Sherbrooke
Abdelkrim Hasni, Université de Sherbrooke
Valérie Vinuesa, Université de Sherbrooke
Élise Rodrigue-Poulin, Université de Sherbrooke
Gabriela Quintela Do Carmo, Columbia University in the City of New York
Étienne Gendron, Université de Sherbrooke

Bringing the Outside In and Inside Out: Connecting Socioemotional Learning with Science (Virtual)
Ava Marie Gibler, California Polytechnic State University, San Luis Obispo
Alexis Van Howe, California Polytechnic State University, San Luis Obispo
Jasmine McBeath Nation, California Polytechnic State University, San Luis Obispo
Kurt Holland, California Polytechnic State University, San Luis Obispo

Marine Science, Climate Change, and the NGSS: Lessons Learned from an Initial Round of PD
Lauren Madden, The College of New Jersey
Louise Ammentorp, The College of New Jersey
Nathan Magee, The College Of New Jersey, Physics Department
Graceanne Taylor, Save Barnegat Bay

3/27/22

Research Committee
Admin Symposium-Latinx Science Learners and Scientific Literacy: Successes and Challenges
4:45 PM-6:15 PM, Parq Salon E (livestream 2)

Panelists
Regina Suriel, Valdosta State University
Alejandro J. Gallard, Georgia Southern University
Angela Chapman, University Of Texas Rio Grande Valley
Lizette de Robles
Diego F. Rojas-Perilla, Teachers College, Columbia University
Enrique H Suarez
Tatiane Russo-Tait, University of Texas At Austin
Diana Camacho, Oregon State University

3/27/22

Equity And Ethics Committee
Admin Symposium-Jhumki Basu Poster Symposium
4:45 PM-6:15 PM, Kitsilano Ballroom D

Organizers
María González-Howard, University of Texas at Austin
Justina Ogodo, Baylor University
Sara Sallom, University of Balamand, Lebanon
Enrique Suarez, University of Massachuttes, Amherst
Jenny Norman, University of Minnesota

Critical Approaches Leveraging Technology In Science Education
Phillip A. Boda, University of Illinois at Chicago

Towards Liberating Methods: Ethnodance as an Embodied Narrative of Black Students' Science Identity
Mindy J. Chappell, University of Illinois at Chicago

Meaningful Assessment of Engineering Experts' and Teachers' Conceptions of Nature of Engineering
Erdogan Kaya, George Mason University
Ezgi Yesilyurt, Weber State University
Hasan Deniz, University of Nevada Las Vegas

Learning How to Mean Through Multimodality Embedded in Modeling – "Scientifically" Speaking (Virtual)
Ayca K. Fackler, University of Georgia

Exploring Students Mechanistic Reasoning Within the Context of Resource Oriented Instructional Materials
Clausell Mathis, University of Washington
Lisa Goodhew, Seattle Pacific University
Paula Heron, University of Washington

Experiences of prospective and novice science teacher educators during the design of k-12 science methods courses
José Pavez, University of Georgia

Experiences of School Science Coordinators During the COVID-19 Pandemic: An International Perspective
Harleen Singh, Medaille College
Hong H. Tran, University of Georgia
Hatice Ozen-Tasdemir, University of Georgia
Yuxi Huang, University of Georgia

Julie A. Luft, University of Georgia
Brooke A. Whitworth, Clemson University

Machine Learning Scoring Bias on Students that are Underrepresented in STEM (Virtual)
Xiaoming Zhai, University of Georgia

3/27/22

Multi-Strand-*Virtual Session B*
4:45 PM-6:15 PM, Parq Salon F (livestream 3)

High School Students' Emergent Positions from Science Internships (Virtual)
Pei-Ling Hsu, University Of Texas At El Paso
Dina Thomason, University Of Texas At El Paso

Citizen Science in School: the Case of the Invasion of Wild Boars (Virtual)
Keren Sarah Levy, Technion - Israel Institute Of Technology
Keren Mintz, Technion - Israel Institute Of Technology
Tali Tal, Technion - Israel Institute Of Technology

Writing Science in English at College: Non-Anglophone Students' Participation in Epistemic Practices (Virtual)
Luciana Martiliano Milena, Universidade Federal Do ABC
Danusa Munford, Universidade Federal de Minas Gerais
Priscila C. Fernandes, Universidade Federal de Sao Joao del Rei

Motivations of Scientists and Teachers to Collaborate in School-Based Citizen Science Projects (Virtual)
Osnat Atias, University of Haifa
Ayelet Baram-Tsabari, Technion - Israel Institute of Technology
Ayelet Shavit, Technion - Israel Institute of Technology
Yael Kali, University of Haifa

3/28/22

Strand 1: Science Learning: Development of student understanding
SC-organized paper set-Pedagogical Approaches to Enhance Science Understading
8:00 AM-9:30 AM, Kitsilano Ballroom A
Presider: Tammy M. Long, Michigan State University,

Applying art-based methods to talk with children about nature, technology, and health
Ene Ernst Hoppe, University of Copenhagen
Katia Bill Nielsen, Universtity of Copenhagen
Henriette T. Holmegaard, University Of Copenhagen

Please Mind the Gap: Black Boxes as a Pedagogical Construct in the Biology Classroom
Gur Arie Livni Alcasid, Department of Science Teaching, Weizmann Institute of Science
Michal Haskel Ittah, The Weizmann Institute Of Science

Student Depictions of the Engineering Design Process
Alexandria Muller, University of California- Santa Barbara
Marco Barron, University of California- Santa Barbara
Devon M Christman, UCSB
Ron Skinner, MOXI, The Wolf Museum of Exploration + Innovation
Danielle Boyd Harlow, University Of California At Santa Barbara

The interplay between students' motivational profiles and science learning
Marcus Kubsch, IPN - Leibniz Institute for Science and Mathematics Education
David L. Fortus, Weizmann Institute Of Science
Knut Neumann, Leibniz Institute for Science Education (IPN) Kiel
Jeffrey Nordine, Leibniz Institute for Science and Mathematics Education (IPN)
Joseph S. Krajcik, Michigan State University

3/28/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions
SC-organized paper set-Science Teaching & Learning during the Pandemic
8:00 AM-9:30 AM, Kitsilano Ballroom D
Presider: Wanja Gitari, University of Toronto,

Investigating the Triple Threat of COVID-Necessitated Online Engineering Courses to Diverse Students' Sense of Belonging
Thomas R. Tretter, University of Louisville
Brian S Robinson, University of Louisville
Jessica B Buckley, University of Louisville
Alex Hammond, University of Louisville

Reimagining Virtual Participatory Design Research: Supporting Youth's Rightful Presence in a Community Science Project
Rishi Krishnamoorthy, Rutgers University
Edna Tan, University Of North Carolina At Greensboro
Ravit Golan Duncan, Rutgers University
Frieda Reichsman, The Concord Consortium
Sarah Haavind, The Concord Consortium
Tiahna Selby, Rutgers University
Burrell Smithen, Rutgers University
Tasha Austin, Rutgers University

Student emotional engagement through the emergency transition to online learning due to COVID-19
Emma Wester, Donald Danforth Plant Science Center
Lisa L. Walsh, Donald Danforth Plant Science Center
Kristine Callis-Duehl, Donald Danforth Plant Science Center

Student Interest, Concerns and Information-Seeking Behaviors Related to Covid-19 (Virtual)
Jamie Elsner, University of North Carolina at Chapel Hill
Troy D Sadler, University of North Carolina at Chapel Hill
Laura Zangori, University Of Missouri
Patricia J. Friedrichsen, University Of Missouri–Columbia
Li Ke, University of North Carolina at Chapel Hill

3/28/22

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
SC-organized paper set-Designing and enacting pedagogy for secondary classrooms
8:00 AM-9:30 AM, Parq Salon C
Presider: Avraham Merzel, The Hebrew University of Jerusalem,

Effects of pedagogical interruptions on secondary student interest, engagement, and comprehension of narrative science videos.
Matthew Kloser, University Of Notre Dame
Michael Szopiak, University of Notre Dame
Catherine Wagner, University of Notre Dame

Exploration of Teacher Discursive Claims Enacting Social Justice Pedagogy in 7th grade Science
Fredrica Nash, The George Washington University

The agile educator: investigating science teachers' pedagogical capacity to design subject-specific up-to-date citizenship lessons
Ineke Henze-Rietveld, Delft University of Technology & Radboud University
Erik Barendsen, Radboud University & Open University
Dury Bayram Jacobs, Eindhoven University of Technology

3/28/22

Strand 5: College Science Teaching and Learning (Grades 13-20)
SC-organized paper set-Collaboration to Promote Learning
8:00 AM-9:30 AM, Parq Salon B
Presider: Abdirizak M. Warfa, University of Minnesota,

Analyzing an Interdisciplinary Education and Science/Engineering Team's Interactions Using Activity Theory (Virtual)
Katherine McCance, North Carolina State University
Stephanie Teeter, NC State University
Margaret R. Blanchard, NC State University
Richard Venditti, NC State University

Engineering Design in Introductory Physics: Undergraduate Students' and Graduate Teaching Assistants' Perceptions
Amir Bralin, Purdue University
Thomas Chapman, Purdue University
Jason Morphew, Purdue University
Carina M. Rebello, Purdue University
N Sanjay Rebello, Purdue University

Molecular Orbital Theory in Entry-Level University Chemistry – a Computer-supported Collaborative Intervention
David J Hauck, TU Dortmund University
Insa Melle, TU Dortmund University

Understanding Scientists,' Engineers,' and Educators' Perceptions of Collaboration and Interdisciplinarity: National Survey Validation and Results (Virtual)
Katherine R McCance, North Carolina State University
Margaret R. Blanchard, NC State University

3/28/22

Strand 5: College Science Teaching and Learning (Grades 13-20)
SC-organized paper set-Problem Solving and Critical Thinking
8:00 AM-9:30 AM, Parq Salon D (livestream 1)
Presider: Rebecca S. Eagle-Malone, The University of Akron,

Heartbreak for Underachievement: Perspectives of CTCA on Students' Achievement and Critical Thinking in Computer Studies
Olasunkanmi Adio Gbeleyi, ACEITSE- Lagos State University
Peter A. Okebukola, ACEITSE- Lagos State University
Ibukunolu Adebiyi Ademola, ACEITSE-Lagos State University
Franklin U. Onowugbeda, ACEITSE- Lagos State University
Fred Awaah, University of Professional Studies Accra
Esther Oluwafunmilayo Peter, ACEITSE- Lagos State University
Deborah Oluwatosin Agbanimu, ACEITSE-Lagos State University
Adekunle Ibrahim Oladejo, ACEITSE-Lagos State University
Ashimi B. Ganiyyu, Lagos State University
Hussein T. Abdulazeez, Lagos State University

Investigating the effect of context-based teaching on students' science engagement and perceptions of utility value (Virtual)
Ya-Chun Chen, Institute of Education, National Yang Ming Chiao Tung University

Perspectives on generalizability in problem-solving from undergraduate physics students: Influences of a mastery homework approach
Kevin Hall, University of Illinois at Urbana-Champaign
Stina Krist, University of Illinois at Urbana-Champaign
Eric Kuo, University of Illinois at Urbana-Champaign
Joshua Rosenberg, University of Tennessee

Strategies undergraduate students use to solve a volumetric analysis problem before and after instruction. (Virtual)
Ted M. Clark, The Ohio State University
Nicole Dickson-Karn, The Ohio State University

3/28/22

Strand 7: Pre-service Science Teacher Education
SC-organized paper set-Innovation and enhancement of science practices
8:00 AM-9:30 AM, Granville I
Presider: Hartley Banack, University of Northern British Columbia (UNBC),

Investigating Preservice Secondary STEM teachers' Reflective Practice in a Microteaching Context (Virtual)
Deepika Menon, University of Nebraska-Lincoln
Rosetta Ngugi, Kennesaw State University

Preservice Science Teachers' Descriptions of Simulation-enhanced Inquiry-based Lesson for Asynchronous Learning Environments
Ilgim Ozergun, Bogazici University
Sevil Akaygun, Bogazici University

Science and Engineering Practices and Cognitive Demand Present in Preservice Teachers' Planning and Instruction
Donna Governor, University of North Georgia
April Nelms, University of North Georgia

Virtual Rehearsal Simulations as Authentic Practice Spaces for Developing Scientific Discourse Skills
Tammy D. Lee, East Carolina University
Carrie Lee, East Carolina University
Mark H. Newton, East Carolina University
Jennifer Gallagher, East Carolina University
Paul Vos , East Carolina University
Daniel L. Dickerson, East Carolina University
Bonnie B. Glass, East Carolina University

3/28/22

Strand 8: In-service Science Teacher Education
Symposium-The Role of Emotions in Science Teacher Education and Professional Development
8:00 AM-9:30 AM, Parq Salon F (livestream 3)
Discussant: Maria Varelas, University Of Illinois At Chicago
Presider: Dana Vedder-Weiss, Ben-Gurion University Of the Negev, Israel,

Panelists
Arnau Amat, University Of Vic
Alberto Bellocchi, Queensland University of Technology
Shannon G. Davidson, Florida State University
Vesal Dini, Tufts University
Lama Jaber, Florida State University
Laura Martin Ferrer, University Of Vic
Rotem Trachtenberg-Maslaton, Ben Gurion University of the Negev
Karin Tsarfati-Shaulov, Ben Gurion University of the Negev
Dana Vedder-Weiss, Ben-Gurion University Of the Negev, Israel
Maria Varelas, University Of Illinois At Chicago

3/28/22

Strand 8: In-service Science Teacher Education
Symposium-The Handbook of Research in Science Teacher Education: Current and Future Directions for Research
8:00 AM-9:30 AM, Granville II
Presider: Jose M. Pavez, University of Georgia,

Panelists
Julie A. Luft, University of Georgia
Gail Jones, North Carolina State University
Sarah J. Carrier, North Carolina State University
David F. Jackson, University Of Georgia
Lauren Madden, The College of New Jersey
Soonhye Park, North Carolina State University
Rachel Mamlok-Naaman, The Weizmann Institute of Science
Jose M. Pavez, University of Georgia

3/28/22

Strand 10: Curriculum and Assessment
Related Paper Set-Research and Practice Perspectives on Developing and Implementing a Three-Dimensional District Biology Assessment
8:00 AM-9:30 AM, Kitsilano Ballroom B

A District Perspective on Developing a Three-Dimensional Science Assessment
Sylvia Scoggin, Washoe County School District
Rebecca Curtright, Washoe County School District
Elizabeth X. De Los Santos, University of Nevada, Reno
Candice R. Guy-Gaytán, BSCS Science Learning

A District Perspective on the Use of Science Assessment Data
Rebecca Curtright, Washoe County School District
Sylvia Scoggin, Washoe County School District
Elizabeth X. De Los Santos, University of Nevada, Reno
Candice R. Guy-Gaytán, BSCS Science Learning

Investigating Teachers' Professional Learning Experiences on an Assessment Development Team
Elizabeth X. De Los Santos, University of Nevada, Reno
Candice R. Guy-Gaytán, BSCS Science Learning
Suzanne Lewis, University of Nevada, Reno

Investigating Students' Reasoning on a Practices-based Exam
Candice R. Guy-Gaytán, BSCS Science Learning
Suzanne Lewis, University of Nevada, Reno
Elizabeth X. De Los Santos, University of Nevada, Reno

3/28/22

Strand 11: Cultural, Social, and Gender Issues
Symposium-Indigenizing the Processes of Science and Engineering: Increasing Inclusivity with Implementation of the SEP's
8:00 AM-9:30 AM, Parq Salon E (livestream 2)
Discussant: Pauline Chinn, University of Hawaii at Manoa
Presider: Julie Robinson, University of North Dakota,

Panelists
Julie Robinson, University of North Dakota
Pauline W. U. Chinn, University of Hawaii at Manoa
Frank Bowman, University of North Dakota
Bethany Klemetsrud, University of North Dakota
Bhaskar Upadhyay, University of Minnesota
Rebekah Hammack, Montana State University
Paichi Shein, National Sun Yat-sen University
Peresang Sukinarhimi
Nick Lux, Montana State University
Paul Gannon, Montana State University

3/28/22

Strand 11: Cultural, Social, and Gender Issues
SC-organized paper set-Considering Gender in Higher Education
8:00 AM-9:30 AM, Kitsilano Ballroom C
Presider: Sara L. Salisbury, Middle Tennessee State University,

Durability of Systemic Gendering of STEM in College STEM Students' Definitions of a STEM Person (Virtual)
Heidi Cian, Florida International University
Remy Dou, Florida International University

Influence of Active Goals on Attitudes, Intentions, and Academic Behaviors of STEM Women in an Undergraduate Peer Mentoring Program
Jennifer A. Gatz, Stony Brook University
Angela M. Kelly, Stony Brook University
Monica Bugallo, Stony Brook University

Gender Dynamics During Discourses in SCALE-UP Format of Physics Course: An Exploratory Single Case Study
Mark O Akubo, Florida State University and Cornell University
Sherry A. Southerland, Florida State University

3/28/22

Strand 13: History, Philosophy, Sociology, and Nature of Science
Admin Symposium-The Unnatural Nature of Science without Norm Lederman: Honoring the Legacy of Dr. Norman Lederman
8:00 AM-9:30 AM, Burrard

Panelists
Valarie L. Akerson, Indiana University
Judith S Lederman, Illinois Institute of Technology
Dana L Zeidler, University of South Florida
Renee Schwartz, Georgia State University
Valarie L. Akerson, Indiana University
Fouad Abd-El-Khalick, University Of North Carolina At Chapel Hill

3/28/22

Strand 14: Environmental Education and Sustainability
SC-organized paper set-Lenses on environmental science educators
8:00 AM-9:30 AM, Stanley
Presider: Xavier Fazio, Brock University,

Assessing Elementary Preservice Teachers' Knowledge, Awareness, Attitude, and Beliefs Toward Environmental Education
Mamta Singh

Investigating the Knowledge Bases Science Teachers Use When Considering a Socioscientific Issue
Lucas Menke, Drake University
Jerrid Kruse, Drake University
Kinsey Zacharski, Drake University
Sarah Voss, Drake University

Ohio Secondary Science Teachers' Climate Change Instruction (Virtual)
Lisa A. Borgerding, Kent State University
Jennifer Heisler, Kent State University
Breanna Beaver, Kent State University

Understanding How an Environmental Educator Identifies & Thinks about Environmental Issues
Hamza Malik
Stephen B. Witzig, University Of Massachusetts Dartmouth

3/28/22

Membership And Election Committee
Admin Symposium-Leaders Wanted: Envisioning Pathways to NARST Leadership
8:00 AM-9:30 AM, Parq Salon A

Panelists
Bridget K. Mulvey, Kent State University
Melody Russell, Auburn University
Mary M. Atwater, University Of Georgia
Nazan U. Bautista, Miami University
Jeanna R. Wieselmann, Southern Methodist University

3/28/22

Research Committee
Admin Symposium-Sandra K. Abell Institute for Doctoral Students 2021 Poster Symposium
8:00 AM-9:30 AM, Cambie

Organizers
Asli Sezen-Barrie, University of Maine
Rouhollah Aghasaleh, Humboldt State University
Sara Tolbert, Te Whare Wananga O Waitaha University of Canterbury
Kathryn Scantlebury, University of Delaware

Phronetic Science: Reflections on the First Virtual SKAIDS in a Social-natural Crisis
Rouhollah Aghasaleh, Humboldt State University
Sara Tolbert, University of Canterbury, New Zealand
Kathryn Scantlebury, University of Delaware, USA

Addressing the diversity issues in Science & Engineering in Ph.D. Programs
Lisa Hanson, Middle Tennessee State University

Be like water: The role of science in social movements towards justice and multi species solidarity
Jenny Tilsen, University of Minnesota

Redefining productive struggle through an asset-based perspective
Clarissa Keen, University of Massachusetts Boston

Design principles for implementing Lesson Study: A professional development model for graduate teaching assistants
Nicole Suarez, University of California San Diego and San Diego State University

Questioning the Core Ideas: Approaching NGSS using a Lens of Ecofeminism
Suzanne Poole Patzelt, Montclair State University

Care and Harm in California Science Teacher Preparation Curriculum
Caroline Spurgin, University of California Santa Cruz

Elements of Humanizing Pedagogy in K-8 Science Teacher Preparation
Dan Moreno, University of Arizona

Learning How to Build Knowledge in Science Through Multimodality Embedded in Modeling
Ayca Fackler, University of Georgia

Historicizing Contemporary Access & Equity Discourses in P-12 Engineering Education Curricular Materials
Natalie De Lucca, Vanderbilt University

"Kinda awful.I spent a lot of time crying": Attending to the Emotions of PSTs of Color
Victor Kásper, Florida State University

Pathways of Indigenous Science in Environmental Conservation of Thai Urban society
Waralee Sinthuwa, Faculty of Education, Kasetsart University

Asset-Based Supplemental Chemistry
Klaudja Caushi, University of Massachusetts Boston

The Tensions of Bridging the Culture of Home and School Science through Ethnic Education in an Indigenous Community in Taiwan
Mu-Yin Lin, The University of Georgia

(Re)defining Teacher Perceptions of Student Science Success to Promote Unity and Inclusion in Science Education
Takeshia Pierre, University of Florida

A portrait of Postsecondary STEM Teaching: mixed-method study examining the influence of identity and context
Sule Aksoy, Syracuse University

Multimodal revoicing: Embodied student resources to support students' explanations of science phenomena
Samuel Lee, Boston College

Equity Audit: Why Aren't the Black Students Showing Up?
Dionne Wilson, Florida State University

3/28/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions
SC-organized paper set-Science Teaching & Learning at the College Level
11:00 AM-12:30 PM, Parq Salon A

Presider: T.B.M. Chowdhury

Undergraduate STEM Majors' Association of K-12 Experiences with their STEM Identities (Virtual)
Remy Dou, Florida International University
Heidi Cian, Florida International University

Group Dynamics: Examining Group Member Roles in Small Group Data-Based Argumentation Tasks in the context of a Large-Lecture Course
Andy Cavagnetto, Washington State University
Nyck Ledezma, Cal Poly Pomona
Archer Harrold, University of Nebraska
Anna Ferroggiaro, Washington State University
Brandon Call, Washington State University
Dana Roach, Washington State University
Lauren Duffy, Washington State University
Jessie Arneson, Washington State University
Erika Offerdahl, Washington State University
Jacob Woodbury, Washington State University

Teaching science while socially distanced: College science laboratory instructors' experiences with synchronous hybrid courses
Laura B. Schneider, St. Mary's College of Maryland; Great Mills High School

Perceiving data as inconsistent with expectations - an important factor for sense-making of experimental results
Burkhard Priemer, Humboldt Universität zu Berlin
Sophia Chroszczinsky, Humboldt Universität zu Berlin
Amy M Masnick, Hofstra University

3/28/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Related Paper Set-Supporting Anti-Deficit Noticing and Equitable Science Teaching and Learning
11:00 AM-12:30 PM, Parq Salon D (livestream 1)
Presider: David P. Steele, Alder Graduate School of Education,

Rearticulating Deficit Language Ideologies with Researchers and Teachers in Elementary Science Professional Development (Virtual)
Ashlyn Pierson, The Ohio State University
Bethany Daniel, Vanderbilt University
Sarah Jaewon Lee, Vanderbilt University
Andrea Wentworth Henrie, Vanderbilt University
Heather J. Johnson, Vanderbilt University
Danielle T. Keifert, University of North Texas
Noel Enyedy, Vanderbilt University

Secondary Pre-service Teachers Becomings: Fostering Anti-deficit Noticing Through Attending To Students' Sense-making Repertoires
David P. Steele, Alder Graduate School of Education
Sophia Jeong, The Ohio State University
Natasha Hillsman Johnson, University of Toledo

Use of Science and Engineering Practices to Create Equitable STEM Learning: Implication For Teachers' Anti-deficit Noticing
Meenakshi Sharma, sharma_m@mercer.edu

Community-based Research as Pedagogy for Strength-based Teacher Education
Adam Bell, University of Washington
Jeff Chandler, University of Washington
Gracie Merrett, University of Washington

Conditions Expanding Opportunities for Pre-service Teachers to Learn in Field Placements
Karin Lohwasser, University of California, Santa Barbara
Caroline Hadley Long, University of Washington
Soo-Yean Shim, University of Illinois
Mark Windschitl, University Of Washington
Tammy Q. Tasker, Western Washington University

3/28/22

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies
Symposium-International Collaborative Investigation of Third Grade Students' Understandings of Scientific Inquiry
11:00 AM-12:30 PM, Parq Salon B

Panelists
Judith S. Lederman, Illinois Institute Of Technology
Selina L. Bartels, Valparaiso University
Juan P. Jimenez, Illinois Institute of Technology

3/28/22

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
SC-organized paper set-Student motivation and creativity in secondary science
11:00 AM-12:30 PM, Parq Salon C
Presider: Wardell Anthony Powell, Framingham State University,

A new way to promote creative thinking skills of students: Innovative science learning environments
Ferah Ozer, Bogazici University
Nihal Dogan, Bolu Abant Izzet Baysal University

Adolescents' Motivation and Self-Efficacy in Science Face-to-Face Learning Environments vs. in Distance Learning
Shira Passentin, Weizmann Institute of Science
David L. Fortus, Weizmann Institute Of Science

Variations in the Co-occurrence of Epistemic Agency and Collective Enterprise
Jessica L. Alzen, University of Colorado Boulder
Kelsey D. Edwards, Northwestern University
William R. Penuel, University of Colorado
Brian J. Reiser, Northwestern University
Cynthia Passmore, University of California-Davis
Chris D. Griesemer, University of California Davis
Aliza Zivic, Northwestern University
Christina M Murzynski, Northwestern University
Jason Buell, Northwestern University

3/28/22

Strand 6: Science Learning in Informal Contexts
SC-organized paper set-Evaluating informal learning interventions
11:00 AM-12:30 PM, Kitsilano Ballroom A
Presider: Miri I. Barak, Technion - Israel Institute Of Technology,

Building Capacity for Collective Evaluation across ISE Centers: A Tested Model for a Collaborative Approach
K. C. Busch, North Carolina State University
Lynn Chesnut, North Carolina State University
Regina Ayala Chavez, North Carolina State University
Kathryn T. Stevenson, North Carolina State University
Lincoln Larson, North Carolina State University
Charles Yelton, North Carolina Museum of Natural Science

Examining Practices and Attitudes about the NSF's Broader Impacts Criterion: A Systematic Literature Review
Stephanie Teeter, NC State University

Spatial Drawing Ability: Informal Learning Experiences
Kimberly Ann Currens, Texas A&M University
Sandra B. Nite, Texas A&M University
Ali Bicer, University of Wyoming
Jihu Lee, Allen Academy
Lila Moseley, Texas State University
Rachael Jones, Texas A&M University

3/28/22

Strand 7: Pre-service Science Teacher Education
SC-organized paper set-Connecting science and society in teacher education
11:00 AM-12:30 PM, Cambie
Presider:

ENACT Project: Promoting Pre-service Science Teachers' Perceptions on Social Responsibility of Scientists and Engineers (Virtual)
Yeonjoo Ko, Ewha Womans University
Hyunju Lee, Ewha Womans University
Jiyeon Hong, Ewha Womans University

Establishing a Community of Practice to Support Elementary Preservice Teachers' Socioscientific Issues-Focused Instruction
Melanie Kinskey, Sam Houston State University
Dana L. Zeidler, University Of South Florida

Exploring connections between anxiety and science understanding around Covid-19
Tina Vo, University of Nevada- Las Vegas
Margarita Huerta, University of Nevada- Las Vegas
Heather Dahl, University of Nevada- Las Vegas
Kenneth Varner, University of Nevada- Las Vegas

Preservice science teachers' competences in evidence-based practice – A longitudinal case study
Pascal Pollmeier, Paderborn University
Sabine Fechner, Paderborn University

3/28/22

Strand 8: In-service Science Teacher Education
SC-organized paper set-Tools and Techniques to Understand and Support Teacher Learning
11:00 AM-12:30 PM, Stanley
Presider: Venkat Rao Vishnumolakala, Curtin University,

It's the work that it does, not the object itself: Scientific posters as boundary objects
Shannon G. Davidson, Florida State University
Sherry A. Southerland, Florida State University
Lama Jaber, Florida State University

The types of feedback used by teacher educators in engineering design workshops and their effectiveness
Minyoung Gil, Pennsylvania State University
Matthew Johnson, Pennsylvania State University

Tools for Observing Productive Talk: A Comparison of Two Protocols (RTOP/IQA-SOR)
Patrick J. Enderle, Georgia State University
Claudia Hagan, Georgia State University
Sierra Lynn Morandi, Florida State University
Ryan Coker, Florida State University
Victor Kasper, Florida State University
Danielle M. Vande Zande, Florida State University
Jennifer Schellinger, FSU
Sherry A. Southerland, Florida State University

Using Argumentative Tasks to Promote Out of Field Physics Teachers' Professional Development
David Perl Nussbaum, Weizmann Institute of Science
Edit M. Yerushalmi, Weizmann Institute of Science

3/28/22

Strand 8: In-service Science Teacher Education
SC-organized paper set-The Role of Collaboration in Teacher Learning
11:00 AM-12:30 PM, Granville II
Presider: Emmanuel Mushayikwa, University of the Witwatersrand,

A Design-Based Research Methodology Utilizing Conjecture Mapping to Frame Embedded Co-design Cycles
Amanda N. Peel, Northwestern University
Jacob Kelter, Northwestern University
Lexie Zhao, Northwestern University
Michael Horn, Northwestern University
Uri Wilensky, Northwestern University

Experienced Teachers' Thinking about NGSS Classroom Assessment: Resources, Coherences with Instruction, and Shifts through Co-Design
Jennifer Richards, Northwestern University
Olivia D. Masse, Northwestern University
Kevin Cherbow, Florida State University
Miray Tekkumru Kisa, Florida State University

Investigating the Effectiveness of an Innovative Professional Development Program for Inquiry-based Secondary Science Education
Arne Bewersdorff, Technical University of Munich
Armin Baur, Heidelberg University of Education
Markus Emden, Zurich University of Teacher Education

Multimodal Analysis of Science Teachers' Facework During Collaborative Video-Based Learning (Virtual)
Adi Mendler, Ben-Gurion University of the Negev, Israel
Dana Vedder-Weiss, Ben-Gurion University Of the Negev, Israel

3/28/22

Strand 8: In-service Science Teacher Education
Related Paper Set-Centering Place-Based Education for Teaching Science Outdoors in Urban Contexts
11:00 AM-12:30 PM, Kitsilano Ballroom C

Understanding Informal Science Educator Identity as Critical Leverage for Science Teaching & Learning Partnerships (Virtual)
Gail Richmond, Michigan State University
Roberta Hunter, Michigan State University
Eleanor Kenimer, Michigan State University

Cultural Historical Activity Theory (CHAT) as a lens for understanding challenges of developing successful formal/informal science education partnerships (Virtual)
Eleanor Kenimer, Michigan State University
Gail Richmond, Michigan State University

The power of virtual platforms to support teacher learning and community development for urban outdoor science teaching (Virtual)
Roberta Hunter, Michigan State University
Irene S. Bayer, Michigan State University
Gail Richmond, Michigan State University

The role of professional learning in the development of questioning
Kara Haas, Michigan State University
Tali Tal, Technion
Gail Richmond, Michigan State University

The role of context in supporting responsive place-based urban science teaching
Tali Tal, Technion
Gail Richmond, Michigan State University
Roberta Hunter, Rutgers University

3/28/22

Strand 10: Curriculum and Assessment
Related Paper Set-Teaching and Learning about COVID-19 in the Midst of the Pandemic
11:00 AM-12:30 PM, Parq Salon E (livestream 2)

Justice-Centered STEM Education to Address Pressing Societal Challenges Using the Case of the COVID-19 Pandemic
Okhee Lee, New York University
Todd Campbell, University of Connecticut

Teacher Learning Through Collaborative Curriculum Design During the COVID-19 Pandemic
Troy D Sadler, University of North Carolina at Chapel Hill
Li Ke, University of North Carolina at Chapel Hill
Patricia J. Friedrichsen, University Of Missouri–Columbia
Rebecca Rawson
Laura Zangori, University Of Missouri

COVID Connects Us: Tensions and Celebrations
Yang Zhang, University of Rochester
April Lynn Luehmann, University Of Rochester

Teaching Science During the COVID-19 Pandemic: A National Study of Teacher of Decision Making
Peggy J. Trygstad, Horizon Research, Inc.
Sean Smith, Horizon Research, Inc.

Understanding Minoritized Youth Learning through Social Networks during the COVID-19 Multi-pandemic (Virtual)
Angela Calabrese-Barton, University of Michigan
Francisco Parra, University of Michigan
Frankie Calabrese Barton, Youth Action Council
Grace Rose, Youth Action Council
Devon Riter, University of Michigan
Day W. Greenberg, University of Michigan

3/28/22

Strand 11: Cultural, Social, and Gender Issues
Symposium-Multiplying Perspectives on Racial Equity in STEM Education: Insights from Canada, Netherlands, and the USA.
11:00 AM-12:30 PM, Granville I
Presider: Jennifer Adams, University Of Calgary,

Panelists
Sarah Halwany, University of Calgary
Jennifer Adams, University Of Calgary
Terrell R. Morton, University of Missouri - Columbia
Tia C. Madkins, The University of Texas At Austin
Claire Paton, University of Calgary
Nadia Qureshi, University of Toronto
Theila Smith, University of Groningen
Shari Watkins, American University
Kevin Hewitt, Dalhousie University
Maydianne Andrade, University of Toronto
Juliet Daniel, McMaster University
Carl James, York University
ReAnna Roby, Vanderbilt University
Whitney McCoy, Duke University
Kristal Turner, University of Calgary

3/28/22

Strand 11: Cultural, Social, and Gender Issues
SC-organized paper set-Critical Race Theory and Other Race Critical Approaches to STEM Education
11:00 AM-12:30 PM, Kitsilano Ballroom D
Presider: Selene Y. Willis, University Of South Florida,

A Critical View of STEM Curriculum from the LatCrit Perspective
Gianna Lopez-Colson, University of Texas Rio Grande Valley
Joe De Leon, University of Texas Rio Grande Valley
Roxana Jimenez, University of Texas Rio Grande Valley

Case Studies of Science Teachers' Experiences With a State Law Banning Critical Race Theory
Katherine Wade-Jaimes, University of Nevada
Rachel D. Askew, Vanderbilt University

Re-Constructing the "Black" Box and Making it Transparent for the Future of Science and Technology in Science Education: Towards Equitable, Social Justice Criticality
Noemi Waight, University at Buffalo
Shakhnoza Kayumova, University of Massachusetts-Dartmouth
Jennifer Tripp, University at Buffalo
Feyza Achilova

Science Preservice Teachers' Views on Diversity and Race in the Science Classroom (Virtual)
Preethi Titu, Kennesaw State University
Seema Rivera, Clarkson University

3/28/22

Strand 13: History, Philosophy, Sociology, and Nature of Science
SC-organized paper set-NOS and Science Pedagogy and instruction
11:00 AM-12:30 PM, Burrard
Presider: Hernan Cofre, Pontificia Universidad Católica de Valparaíso,

Evaluation of Nature of Science Representations in Biology School Textbooks Using the Family Resemblance Approach (Virtual)
Kristina Fricke, Freie Universität Berlin
Bianca Reinisch, Freie Universität Berlin

Exploring the Articulation of Nature of Science Ideas in Turkish Middle School Science Textbooks
Beyza Okan, Bogazici University
Ebru Kaya, Bogazici University

Impacts of Professional Science Experience on Induction Science Teachers' NOS understandings, Pedagogy, and Science Identities
Emily Little, Georgia State University
Robert D. Bennett, Georgia State University
Renee Schwartz, Georgia State University

Proposed Teacher Competencies to Support Effective Nature of Science Instruction: A Meta-Synthesis of the Literature (Virtual)
Noushin Nouri, University of Texas Rio Grande Valley
William F McComas, University Of Arkansas

3/28/22

Strand 14: Environmental Education and Sustainability
SC-organized paper set-Making sense of socioscientific issues
11:00 AM-12:30 PM, Kitsilano Ballroom B
Presider:

Adjusting the Lens: Elementary Students Sharing and Learning about Climate Change through Photovoice
Imogen R Herrick, University of Southern California
Michael Lawson, Kansas State University
Ananya Matewos, St. Norbert College

Investigating Relationship(s) Between Epistemological Beliefs, Argument Quality and Informal Reasoning in the Context of SSI (Virtual)
Cansu Basak Uygun, Middle East Technical University
Ozgul Yilmaz-Tuzun, Middle East Technical University

Moral and ethical development through Socioscientific Holistic Perspectives (SSHP)
Eric Nolan, Northern Arizona University, Flagstaff

Pre-Service Secondary Science Teachers' Views on Teaching Socioscientific Issues
Jen-Yi Wu, National Taiwan Normal University
Ying-Shao Hsu, National Taiwan Normal University
Wen-Xin Zhang, National Taiwan Normal University

3/28/22

Multi-Strand-*Virtual Session D*
11:00 AM-12:30 PM, Parq Salon F (livestream 3)

3D Printing with Preservice Teachers: Implementation, Effects, and Future Directions (Virtual)
Shannon L. Navy, Kent State University
Elena Novak, Kent State University

Visualizing STEM in Pakistan: Insights from a Professional Development for Conceptualizing STEM (Virtual)
Tasneem Anwar, The Aga Khan University

An Investigation of Differences in Students' Interest in STEM Among NGSS and Non-NGSS Implementation (Virtual)
Brienne May, Liberty University
Jillian L. Wendt, University of the District Of Columbia
Michelle Barthlow, Liberty University

Development of Students' Systems Thinking and Problem-solving through Authentic Aerosol Science Research (Virtual)
Jeremy W Melton, National Sun Yat-sen University, Taiwan
Paichi-Pat Shein, National Sun Yat-sen University, Taiwan
Jepri A. Saiful, National Sun Yat-sen University, Taiwan

3/28/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions
SC-organized paper set-Student Experiences in Science Teaching & Learning
2:45 PM-4:15 PM, Parq Salon A
Presider: Lynn D. Dierking, Oregon State University,

"Do worms have urine?": Resources students draw upon in response to uncertainty in biology laboratories
Sam Skrob-Martin, Florida State University
Alicia Batailles
Sherry A. Southerland, Florida State University

"Why aren't you listening to me?!: Community and Individual roles in students' epistemic agency in science
Jennifer Schellinger, FSU
Katarina Gomez, Florida State University
Lama Z Jaber, Florida State University
Sherry A Southerland, Florida State University

Using Making to Transform the Learning of Physics into a Personally Meaningful Experience
Tal Peer, Technion - Israel Institute of Technology
Shulamit Kapon, Technion - Israel Institute of Technology

Implementing Contextualized Science Curriculum and Instruction in Tanzania: The Practice and Possibilities
Winston E Massam, Assistant Professor - Aga Khan University (Institute for Educational Development, East Africa)

3/28/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Related Paper Set-Equity and Justice in Engineering and Science: Centering Black and Latinx culture, language and Identity
2:45 PM-4:15 PM, Parq Salon D (livestream 1)
Presider: Okhee Lee, New York University,

Latent Class Analysis of Black Families' Access to a Community-Based STEM Program
Natalie S. King, Georgia State University
Zachary Collier, University of Delaware
Bridgette G. Johnson, University of Delaware
Melanie Acosta, Florida Atlantic University
Charisse N Southwell, Broward County Public Schools, Fort Lauderdale, Florida

Latinx Students' Sense of Familismo in Undergraduate Science and Engineering
Enrique Lopez, University of Colorado, Boulder
Vincent Basile, Colorado State University
Magnolia Landa-Posas, University of Colorado, Boulder
Kaylee Ortega , University of Colorado, Boulder
America Ramirez, University of Colorado, Boulder

Amplifying the Voices of Multicompetent students in STEM by Centering Justice and Audience Design in Engineering and Science
Greses Pérez, Tufts University
Okhee Lee, New York University

Becoming a Teacher of Engineering as a Racialized Local Contentious Practice (Virtual)
Christopher G. Wright, Drexel University
Rasheda Likely, Kennesaw State University
Mikhail Miller
Neisha Young, Drexel University
Sinead Meehan, Drexel University

Fifth-Grade Engineering and Language, Culture, and Identity: Lessons Learned by Teacher and Researcher
Claudia Walker, Murphey Traditional Academy, Greensboro, NC
Heidi B. Carlone, Vanderbilt University

3/28/22

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies
SC-organized paper set-Strategies for Science and Engineering Education
2:45 PM-4:15 PM, Parq Salon B
Presider:

Elementary Teachers' Verbal Supports during an NGSS-Aligned Unit for Inclusive and General Class Contexts
Sarah C Lilly, University of Virginia
Anne M McAlister, University of Virginia
Jennifer L Chiu, University of Virginia

Elementary Science and Engineering Teaching Self-Efficacy: Trends in the Literature and a Research Framework (Virtual)
Jeanna R. Wieselmann, Southern Methodist University
Deepika Menon, University of Nebraska-Lincoln
Sarah A. Haines, Towson University
Sumreen Asim, Indiana University Southeast

Factors Associated with K-5 Science Teaching Time (Virtual)
Alison Brockhouse, Institute for School Partnership
Maia Elkana, Institute for School Partnership, Washington University in St. Louis
Rachel Ruggirello, Washington University in St. Louis

Teacher Educators and Elementary Teachers Share Goals for Authentic Science and Literacy Integration in the 20th Century Realities of 21st Century Classrooms (Virtual)
Sarah J. Carrier, North Carolina State University
Danielle R Scharen, North Carolina State University

3/28/22

Strand 5: College Science Teaching and Learning (Grades 13-20)
SC-organized paper set-Academic Pathways, Persistence, and Science Identity
2:45 PM-4:15 PM, Kitsilano Ballroom A
Presider: Venkat Rao Vishnumolakala, Curtin University,

Becoming a Scientist: Exploring How Critique Supports the Development of Undergraduate Students' Science Identity
Gabrielle Jablonski, Idaho State University
Anna S. Grinath, Idaho State University

Bridge/or Barrier? Institutional Agents Shape Sense of Belonging for First-Generation STEM Students Holding Intersecting Identities
Angela N. Google, University of South Alabama
Jeremiah Henning, University of South Alabama
Grace Sekaya, University of South Alabama
Zachery McMullen, University of South Alabama

Framework for chemistry course redesign to support first generation college student success
Roshni Bano, University of Illinois At Chicago
Minjung Ryu, University of Illinois At Chicago

Predictors of Community College Astronomy Performance
Zachary Richards, Suffolk County Community College and Stony Brook University
Angela M. Kelly, Stony Brook University

3/28/22

Strand 6: Science Learning in Informal Contexts
SC-organized paper set-Informal learning as a family activity
2:45 PM-4:15 PM, Stanley
Presider: Susanna E. Hapgood, University of Toledo,

Activity Design Principles that Support Family-Based Engineering Learning in Early Childhood
Scott A. Pattison, TERC
Gina N. Svarovsky, University Of Notre Dame
Smirla Ramos-Montañez, TERC
Catherine Wagner, University of Notre Dame
Amy Corbett, Metropolitan Family Service
Maria Perdomo, Metropolitan Family Service
Viviana López Burgos, Independent Consultant
Sabrina De Los Santos, TERC

Engaging children and caregivers in engineering design projects: Development of maker workshops and digital tools
Susan Letourneau, New York Hall of Science
David Wells, New York Hall of Science
Sonja Latimore, GBH
Mary Haggerty, GBH
Peter Ciavarella, New York Hall of Science
Lauren Vargas, New York Hall of Science
Daniel Kirk, New York Hall of Science
Lisa Ellsworth, GBH
Melissa Carlson, GBH
Louise Flannery, GBH

Intergenerational Family Learning in Conservation Science
Jonathan Simmons, University of Connecticut
Todd Campbell, University of Connecticut
David M. Moss, University of Connecticut
John Volin, University of Maine
Chester Arnold, University of Connecticut
Laura M Cisneros, University of Connecticut
Cary Chadwick, University of Connecticut
David Dickson, University of Connecticut
Nicole Freidenfelds, University of Connecticut

3/28/22

Strand 7: Pre-service Science Teacher Education
SC-organized paper set-The role of noticing in learning to teach science
2:45 PM-4:15 PM, Granville I
Presider: Stefan Sorge, IPN - Leibniz Institute for Science and Mathematics Education, Kiel,

Elementary Preservice Teachers' Noticing of Scientific Argumentation within Two Online Practice Spaces (Virtual)
Pamela S. Lottero-Perdue, Towson University
Heidi L. Masters, University Of Wisconsin–La Crosse
Jamie N. Mikeska, Educational Testing Service (ETS)
Meredith M. Thompson, MIT
Meredith Park Rogers, Indiana University
Dionne Cross Francis, University of North Carolina at Chapel Hill

Pre-service Teachers Notice Student Thinking. Then What?
Tara Barnhart, Chapman University
Miray Tekkumuru-Kisa, Florida State University
Heather J. Johnson, Vanderbilt University

Supporting Pre-Service Teachers' Attention to All Students' Ideas Using a Learning Progression Approach
Alicia C. Alonzo, Michigan State University

The impacts of content area on novice teacher noticing-a preliminary analysis (Virtual)
Lu Wang, Indiana University Kokomo

3/28/22

Strand 8: In-service Science Teacher Education
SC-organized paper set-Variations in STEM Teachers Changes through Professional Development
2:45 PM-4:15 PM, Granville II
Presider: Xinying Yin, California State University-San Bernardino,

Exploring The Sources of Science Teachers' Self-Efficacy
Jessica Gale, Georgia Institute Of Technology - CEISMC
Meltem Alemdar, Georgia Institute Of Technology
Christopher Cappelli, Georgia Institute OfTechnology

Trajectories of Adoption and Abandonment After Professional Development in Project-Based Learning (Virtual)
Cesar Delgado, North Carolina State University
Kathryn Green, University of Georgia
Minnie Webster, North Carolina State University

Variable Take-up of Professional Development: How Activity Systems Influence Science Teachers' Enactment of Project-Based Learning
Tess Bernhard, University of Pennsylvania
Amy Guillotte, University of Pennsylvania
Sarah Kavanagh, University of Pennsylvania

Co-Designing to Understand Equity-Focus in Computational Thinking (CT) Integrated Science Curricula
Marissa A. Levy, Northwestern University
Amanda Peel, Northwestern University
Sugat Dabholkar
Lexie Zhao, Northwestern University
Susan Juhl
Lauren Levites
Jacob Mills
Sally Wu
Michael Horn, Northwestern University
Uri Wilensky, Northwestern University

3/28/22

Strand 8: In-service Science Teacher Education
SC-organized paper set-Developing Teacher Leaders
2:45 PM-4:15 PM, Kitsilano Ballroom C
Presider: Avraham Merzel, The Hebrew University of Jerusalem,

Developing and Retaining Mid-Career Science Teachers through a Teacher Leadership Program
Andrea Reeder, Middle Tennessee State University
Fatma Kaya, Middle Tennessee State University
Weiqi Zhao, University of Cincinnati
Melody J Elrod, Middle Tennessee State University
Joshua Reid, Middle Tennessee State University
Greg T Rushton, Middle Tennessee State University
Brett Criswell, West Chester University

Exploring Boundary Spanning as a Theoretical Framework to Design for Science Teacher Leader Professional Learning (Virtual)
Sara C Heredia, The University of North Carolina Greensboro
Michelle Lea Phillips, Exploratorium
Ti'Era D. Worsley, University of North Carolina at Greensboro
Hadrian Pollard, University of North Carolina at Greensboro
Sarah Stallings , University of North Carolina at Greensboro
Julie Yu, Exploratorium

Impact of Teacher Leadership Skills and Adaptability during Educational Upheaval
Christine R. Lotter, University of South Carolina
Amanda Gonczi, Michigan Technological University

Knowledge, Practices, and Attributes of International Science Coordinators and the Resources They Draw Upon: Supporting Teachers During the COVID-19 Pandemic
Harleen Singh, Medaille College
Hatice Ozen_Tasmedir, University of Georgia
Yuxi Huang, University of Georgia
Hong H Tran, University of Georgia
Julie A Luft, University of Georgia
Brooke A Whitworth, Clemson University

3/28/22

Strand 10: Curriculum and Assessment
SC-organized paper set-Assessment for modeling and reasoning
2:45 PM-4:15 PM, Parq Salon C
Presider: Elizabeth X. De Los Santos, University of Nevada, Reno,

Assessing Socio-scientific Systems Thinking for the COVID-19 Pandemic (Virtual)
Eric A Kirk, University of North Carolina at Chapel Hill
Troy Sadler, University of North Carolina at Chapel Hill
Li Ke, University of North Carolina at Chapel Hill
Laura Zangori, University Of Missouri

Exploring Student Reasoning Patterns in the Context of a NGSS-Aligned Assessment Task: The Harvestmen Item (Virtual)
Dante Cisterna, Educational Testing Service
Lei Liu, Educational Testing Service
Aoife Cahill, Educational Testing Service
Devon Kinsey, Educational Testing Service
Xianyang Chen, Educational Testing Service
Yi Qi, Educational Testing Service

Investigation on effect of spatial visualization on scientific modeling in primary and secondary school students (Virtual)
Jing Lin, Beijing Normal University
Letong Zhang, Beijing Normal University
Ping-Han Cheng, National Taiwan Normal University
Chun-Yen Chang, National Taiwan Normal University

Scaffolding Support for Student Modeling in Three Dimensional Assessment Tasks
Kate Henson, University of Colorado
Jason Buell, CU Boulder

3/28/22

Strand 11: Cultural, Social, and Gender Issues
SC-organized paper set-Cultural Approaches to the Teaching and Learning of Science
2:45 PM-4:15 PM, Burrard
Presider:

Improving the Achievement and Problem-solving Skills of Students: How Effective is CTCA in Nuclear Chemistry? (Virtual)
Ibukunolu A. Ademola, ACEITSE-Lagos State University
Peter A. Okebukola, ACEITSE-Lagos State University
Olasunkanmi A. Gbeleyi, ACEITSE-Lagos State University
Adekunle I. Oladejo, ACEITSE-Lagos State University
Franklin U. Onowugbeda, ACEITSE-Lagos State University
Deborah O. Agbanimu, ACEITSE-Lagos State University
Fred Awaah, University of Professional Studies Accra
Esther O. Peter, ACEITSE-Lagos State University
Stella I. Uhuegbu, ACEITSE-Lagos State University
Yetunde A. Mabadeje, ACEITSE-Lagos State University

Teacher Understanding of Funds of Knowledge in the High School Biology Classroom
Molly M. Staggs, University Of South Florida
Karl G. Jung, University Of South Florida
Julie C. Brown, University Of Florida

Underachievement in Difficult Concepts in Biology: Can CTCA be the Way Out?
Francisca A. Allename, ACEITSE- Lagos State University
Peter A. Okebukola, ACEITSE- Lagos State University
Deborah Oluwatosin Agbanimu, ACEITSE- Lagos State University
Franklin U. Onowugbeda, ACEITSE- Lagos State University
Esther Oluwafunmilayo Peter, ACEITSE- Lagos State University

3/28/22

Strand 12: Technology for Teaching, Learning, and Research
Related Paper Set-Learning Chemistry in Immersive Virtual Reality: A Spatial Analysis of Students' Collaborative Interactions
2:45 PM-4:15 PM, Parq Salon E (livestream 2)
Discussant: Joseph Krajcik, Michigan State University
Presider: Chin-Chung Tsai, National Taiwan Normal University, Chin-Chung Tsai, National Taiwan Normal University

An Analytical Framework for Spatial Analysis of Students' Interactions in Immersive Virtual Reality (Virtual)
Mihye Won, Curtin University
Dewi Ungu, Curtin University
Henry Matovu, Curtin University
David F. Treagust, Curtin University
Chin-Chung Tsai, National Taiwan Normal University
Mauro Mocerino, Curtin University
Roy Tasker, Western Sydney University
Joseph S. Krajcik, Michigan State University

Students' Construction of Learning Activities to Understand the Formation of Snowflakes with Three Different Modes (Virtual)
Dewi Ungu, Curtin University
Mihye Won, Curtin University
Henry Matovu, Curtin University
David F. Treagust, Curtin University
Chin-Chung Tsai, National Taiwan Normal University
Mauro Mocerino, Curtin University
Roy Tasker, Western Sydney University

Comparative Analysis on the Impact of Scaffolding on Students' Interactions within Immersive Virtual Reality (Virtual)
David F. Treagust, Curtin University
Dewi Ungu, Curtin University
Mihye Won, Curtin University
Henry Matovu, Curtin University
Chin-Chung Tsai, National Taiwan Normal University
Mauro Mocerino
Roy Tasker, Western Sydney University

Progression of Students' Interactions over Three Immersive Virtual Reality Learning Activities (Virtual)
Henry Matovu, Curtin University
Mihye Won, Curtin University
Dewi Ungu, Curtin University

David F. Treagust, Curtin University
Chin-Chung Tsai, National Taiwan Normal University
Mauro Mocerino, Curtin University
Roy Tasker, Western Sydney University

3/28/22

Strand 13: History, Philosophy, Sociology, and Nature of Science
SC-organized paper set-NOS and Undergraduate Education
2:45 PM-4:15 PM, Kitsilano Ballroom D
Presider: Jacob Pleasants, University of Oklahoma,

Comparing Undergraduates NOS Views in Traditional vs. Inquiry-Taught Science Course
Alex T. St. LouisHayat Hokayam, Texas Christian University

Development and Validation of a Rubric to Qualify and Quantify Responses to the VNOS Questionnaire
Fouad Abd-El-Khalick, University of North Carolina at Chapel Hill
Ryan Summers, University of North Dakota
Jeanne Brunner, University of Massachusetts Amherst
Jeremy Belramino, University of Illinois - Urbana-Champaign
John Y. Myers, University of Illinois at Urbana-Champaign

Learning to Teach NOS: How do NOS instructional views develop during semester-long NOS course?
Jerrid W. Kruse, Drake University
Isaiah Kent-Schneider, Drake University
Sarah Voss, Drake University

University Biology Students' Sociocultural and NOS Associated Positions About Policymakers' and Scientists' COVID-19 Responses
Alex J Sobotka, Texas A&M University
Ben A Janney, Texas A&M University
Benjamin C Herman, Texas A&M University
Sarah V Poor, Texas A&M University
Aaron Kidd, Texas A&M University
Michael P. Clough, Texas A&M University
Asha Rao, Texas A&M University

3/28/22

Strand 14: Environmental Education and Sustainability
SC-organized paper set-Place, culture, and connection in environmental science education
2:45 PM-4:15 PM, Cambie
Presider: Catherine Quinlan, Howard University, School of Education,

Are School Gardens Culturally Relevant? Forging Connections Between High School Students and the Community
Mariam Takkouch, Western University
Isha DeCoito, Western University

Exploring Sense of Place across Generations: A Case study of a Negev Bedouin Community
Wisam Sedawi, Ben Gurion University
Orit Ben Zvi Assaraf, Ben-Gurion University Of the Negev, Israel
Amane Alatamin, Ben-Gurion University Of the Negev, Israel

Understanding Middle School Students' Connectedness with Nature
Andrea Moeller, Unversity of Vienna
Petra Bezeljak, University of Vienna
Gregor Torkar, University of Ljubljana, Slovenia

Using environmental chemistry to engage students in scientific thinking while affirming their cultural context
Jeffrey Spencer, University of Michigan at Ann Arbor
Danielle N Maxwell, University of Michigan at Ann Arbor
Kaare Sikuaq Erickson, Ikaaġun Engagement; Ukpeaġvik Inupiat Corporation
Daniel Wall, Iḷisaġvik College
Linda Nicholas-Figueroa, Iḷisaġvik College; University of Alaska - Fairbanks
Kerri Pratt, University of Michigan at Ann Arbor
Ginger Shultz, University of Michigan at Ann Arbor

3/28/22

Research Committee
Admin Symposium-Unifying Our Community through Science Education
2:45 PM-4:15 PM, Parq Salon F (livestream 3)
Presider: Mary M. Atwater, University Of Georgia,

Organizers
Mary M. Atwater, University Of Georgia
Rona Robinson-Hill, Ball State University
Brittany Garvin-Hudson, University of Mary Washington

3/28/22

Admin Symposium-Graduate Student Forum
6:15 PM-7:20 PM, Parq Salon F (livestream 3)

Panelists
Theila Smith, University of Groningen
Inés Mosquera Bargiela, Universidade de Santiago de Compostela
Emily Little, Georgia State University
Samantha Ringl, Alice Lloyd College
Ti'Era D. Worsley, University of North Carolina at Greensboro
Johan Tabora, University of Illinois at Chicago

3/29/22

International Committee
Admin Symposium-Socioscientific Argumentation in Science Education
7:30 AM-8:45 AM, Parq Salon F (livestream 3)

Panelists (Virtual)
Ute Harms, Leibniz Institute for Science and Mathematics Education (IPN)
Carola Garrecht, IPN - Leibniz Institute for Science and Mathematics Education
Maria Evagorou, University of Nicosia, Nicosia, Cyprus
Nina Christenson, Karlstad University
Susanne Walan, Department of Environmental and Life Sciences, Karlstad University, Karlstad, Sweden
Pablo Brocos, University of Santiago de Compostela
Maria Pilar Jiménez-Aleixandre, Department of Applied Didactics, Universidade de Santiago de Compostela, Santiago de Compostela, Spain
Hanno Michel, IPN Kiel
Dirk S. Gellermann, Leibniz Institute for Science and Mathematics Education (IPN)
Ute Harms, Leibniz Institute for Science and Mathematics Education (IPN)

3/29/22

Strand 1: Science Learning: Development of student understanding
Roundtables-Science in Contexts
8:00 AM-9:00 AM, Roundtable Room
Presider: Gianna Lopez-Colson, University of Texas Rio Grande Valley,

Experiencing the Emergence of Antibiotics Resistant Bacteria: Students' Understanding of the Nature of Evolution (Virtual)
Bat-Shahar Dorfman, Weizmann Institute of Science
Amir Mitchell, Program in Systems Biology, University of Massachusetts Medical School, Worcester, Massachusetts, United States of America, Program in Molecular Medicine, University of Massachusetts Medical School, Worcester, Massachusetts, United States of America
Orna Dahan, Department of Molecular Genetics, Weizmann Institute of Science, Rehovot, Israel
Anat Yarden, Weizmann Institute Of Science

Planning in Science-Integrated Engineering: Kindergartners' Incorporation of Ideas about Inertia in their Design Plans
Pamela S. Lottero-Perdue, Towson University
John Settlage, UConn

3/29/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Roundtables-Strand 2 Round Table: Argumentation in Science Teaching & Learning I
8:00 AM-9:00 AM, Roundtable Room
Presider:

Categorizing Classroom-based Argumentation in Elementary STEM Lessons: Applying Walton's Dialogue Theory
Anna Gillespie-Schneider, UGA
Lorraine Franco, University of Georgia
Barbara A. Crawford, University Of Georgia
Yuling Zhuang, University of Georgia
Jonathan Foster, University of Georgia
AnnaMarie Conner, University of Georgia

Challenge in Reasoning about Evolution Acceptance for Muslim Students: The Mechanism of Motivated Reasoning
Rahmi Q. Aini, Kangwon National University
Minsu Ha, Kangwon National University

Examining Science Engagement: Epistemic Operations and Agentic Practices During Argumentation (Virtual)
Vivian A Zohery, University of Maryland - College Park
Ananya Matewos, Saint Norbert College
Lauren Cabrera, Virginia Commonwealth University
Doug Lombardi, University of Maryland, College Park

3/29/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Roundtables-Strand 2 Round Table: Mediating Learning Processes in Science Teaching & Learning
8:00 AM-9:00 AM, Roundtable Room
Presider: Tamar Ginzburg

The Authoritative-to-Dialogic Spectrum of Facilitation Practices
Carina M Carlos, Tufts University
Vesal Dini, Tufts University
Ira Caspari, Tufts University

The impact of typography in learning materials of science textbook (Virtual)
Rosalie Heinen, University of Münster
Susanne M. Heinicke, University of Münster

Using Student-created Core Idea Maps to Promote Meaningful Learning in Science
Helen Semilarski, Doctoral student
Regina Soobard, Research Fellow of Science Education
Miia Rannikmae, Professor

3/29/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Roundtables-Strand 2 Roundtable: Argumentation in Science Teaching & Learning II
8:00 AM-9:00 AM, Roundtable Room
Presider: Sufen Chen, National Taiwan University Of Science and Technology,

Describing changes in Student thinking about evolution in response to inquiry and argumentation-based instruction
Hernan Cofre, Pontificia Universidad Católica de Valparaíso
Francisca Carmona, Pontificia Universidad Católica de Valparaíso
Diego Canales, Pontificia Universidad Católica de Valparaíso
Paola Nuñez, Pontificia Universidad Católica de Valparaíso
Antonia Larrain, Alberto Hurtado University
Claudia Vergara, Alberto Hurtado University

Examining Relevant Evidence Construction as Actor-Network in the Collective Argumentation (Virtual)
Weiwei He, East China Normal University
Sihan Xiao, East China Normal University

Massive Dependence of Science students' answers about Relativity upon the Formulation of the question
Estelle Blanquet, University of Bordeaux
Eric Picholle, CNRS & Université Côte d'Azur

3/29/22

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies
Roundtables-Instructional methods for supporting students' science understanding
8:00 AM-9:00 AM, Roundtable Room
Presider: Alison Mercier, University of Wyoming,

Revisiting elementary school students' images of scientists (Virtual)
Jing Lin, Beijing Normal University
Wenting Wei, Beijing Normal University
Ting Yuan, Beijing Normal University

The Impact of Arts-based Science Instruction on Emerging Multilingual Students' Achievement in Elementary Science
Sage Andersen, University of Texas At Austin
Brad Hughes, University Of California, Irvine

3/29/22

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
Roundtables-Collaboration and science learning in middle grades
8:00 AM-9:00 AM, Roundtable Room
Presider: Michael Cassidy, TERC,

"What if we explore..." Using Mountain Rescue to Promote Engaged Learning and Collaboration
Denise M. Bressler, East Carolina University
Shane Tutwiler, University of Rhode Island
Amanda Siebert-Evenstone, University of Wisconsin - Madison
Len Annetta, East Carolina University
Jason A. Chen, The College of William & Mary

Developing Scientifically Literate Citizenship: Self-Efficacy Beliefs of an Interdisciplinary Community of Practice
Mandi Collins, University of Nevada, Reno
Elizabeth X. De Los Santos, University of Nevada, Reno
Robert J Quinn, University of Nevada, Reno

Science Teachers' Views on the Integration of Science and Language for Emergent Bilinguals in Sixth-grade Classrooms
Sissy S. Wong, University of Houston
Jie Zhang, University of Houston
Araceli Enriquez-Andrade, University of Houston
Ma Glenda Wui, Ateneo de Manila University

The Effect of Teacher Participation in Multimedia Professional Development on Science Achievement Among Middle-School Students (Virtual)
Victoria J. VanUitert, University of Virginia
Michael J. Kennedy, University of Virginia
Lindsay M. Carlisle, University of Virginia

3/29/22

Strand 5: College Science Teaching and Learning (Grades 13-20)
Roundtables-Becoming Scientists: Students' Scientific Practices and Sense of Belonging
8:00 AM-9:00 AM, Roundtable Room
Presider: Hadeel Omar Edrees Dabbah, Ben-Gurion University of the Negev,

An Interdisciplinary Approach to Develop Interest for Bioproduct Careers with Historically Underrepresented STEM Undergraduates (Virtual)
Shana L. Mcalexander, Duke University
Katherine McCance, North Carolina State University
Margaret R. Blanchard, NC State University
Richard Venditti, NC State University

Building Inclusive Excellence in Undergraduate Science Education through Faculty Learning Communities: A Study of Five Cohorts
Marcelle Siegel, University Of Missouri–Columbia
Yejun Bae
Terrell Morton
Courtney Ngai
Mojtaba Khajeloo
Swarna Mahapatra
Ritesh Sharma
Charles Nilon
Johannes Schul

College Students' Sense of Belonging in the STEM Learning Ecosystem: Classroom, Department, and University Culture (Virtual)
Yejun Bae, Carolina University
Marcelle Siegel, University Of Missouri–Columbia
Mojtaba Khajeloo, University Of Missouri
Terrell R. Morton, University of Missouri - Columbia
Charles Nilon, University of Missouri-Columbia
Johannes Schul, University of Missouri-Columbia
Hyejin Shim, University of Missouri-Columbia

Effect of Demographic Factors on the Understanding of Concepts of Evidence: A Mixed Methods Study (Virtual)
Elizabeth Vergis, St. Mary's University, Calgary

Fostering Undergraduate STEM Students' and Teachers' Systems Thinking and Modeling Skills via a Food-Related Mini-Course
Roee Peretz, Technion—Israel Institute of Technology, Haifa 3200003, Israel
Marina Tal, Technion—Israel Institute of Technology, Haifa 3200003, Israel
Effrat Akiri, Technion—Israel Institute of Technology, Haifa 3200003, Israel
Yehudit Judy Dori, Technion—Israel Institute of Technology, Haifa 3200003, Israel

Dov Dori, Technion—Israel Institute of Technology, Haifa 3200003, Israel

3/29/22

Strand 6: Science Learning in Informal Contexts
Roundtables-Strand 6 Roundtable
8:00 AM-9:00 AM, Roundtable Room
Presider: Lynne Zummo, University of Utah,

Decisions for Our Future: Learning through Collaborative Civic Decision-Making in a Digital Climate Simulation
Lynne Zummo, University of Utah

3/29/22

Strand 7: Pre-service Science Teacher Education
Roundtables-Strand 7 Roundtable
8:00 AM-9:00 AM, Roundtable Room

Computational Thinking Integration in STEM Pedagogy by Teacher Candidates (Virtual)
Heather F. Clark, UCLA
Imelda L. Nava, UCLA
Leticia Perez, UCLA
Jaleel Howard, UCLA

Investigating Pre-Service Teachers' Noticing of the Cultural Foundations of Children's Scientific Explanations
Alison Mercier, University of Wyoming
Tierney Hinman, Auburn University

Preparing and Retaining Race-Conscious Science Teachers Through Race, Culture, & Coffee
Stefanie L. Marshall, University of Minnesota- Twin Cities
Jenny Sarah Tilsen, University of Minnesota- Twin Cities
Jessica Forrester, University of Minnesota- Twin Cities

What Does an Undergraduate Research Experience Look Like in STEM Education?
Jennifer A. Wilhelm, University of Kentucky
Molly Fisher, University of Kentucky

3/29/22

Strand 11: Cultural, Social, and Gender Issues
Roundtables-Strand 11: Fostering Inclusion through STEM Leadership, Teaching, and Learning
8:00 AM-9:00 AM, Roundtable Room
Presider: Uchenna Emenaha, The University of Texas At San Anotnio,

"It's really important to me for kids to get interested in and become aware of the options that are available to them in the STEM": Culturally Responsive School Leadership
Noemi Waight, University at Buffalo
Jennifer Tripp, University at Buffalo
Lorenda Chisolm, Schenectady City School District

Community driven and relational STEM Teacher Leadership: Perceptions of Indigenous Female Teachers
Bhaskar Upadhyay, University of Minnesota
Kamal P Koirala, Tribhuban University, Gorkha Campus, Gorkha, Nepal

Generating an operational framework of gender and sexual diversity (GSD)-inclusive STEM teaching: A systematic literature review
Gary W. Wright, North Carolina State University

Impact of STEM Professionals Engaging with Students in Title One Schools
Sarah K. Guffey, University of South Alabama
Andrea C. Burrows, University Of Wyoming
Andria Schwortz, Quinsigamond Community College

3/29/22

Strand 11: Cultural, Social, and Gender Issues
Roundtables-Strand 11: Structural, Cultural, and Social Factors that Influence Student's STEM Identity and Engagement
8:00 AM-9:00 AM, Roundtable Room
Presider: Kathleen Schenkel, University of Michigan,

Employing the Stereotype Content Model's Dimensions of Warmth and Competence to Identify and Categorize the Portrayal of Scientists in Meme-Based GIFs
Richard Velasco, University of Iowa
Yujiro Fujiwara, Texas Tech University
Lee Kenneth Jones, Asia-Pacific International School
Rebecca Hite, Texas Tech University

Examining the STEM career interest of juvenile justice youth using the Social Cognitive Career Theory (Virtual)
Ally Hunter, University of Massachusetts, Amherst
Heather Griller Clark, Arizona State University
Michael Krezmien, University of Massachusetts, Amherst
Sarup Mathur, Arizona State University
Craig Wells, University of Massachusetts, Amherst

How to Broaden Participation in STEM by Indigenous Islanders
Jon Boxerman, WestEd
Sharon Nelson-Barber, WestEd
Kimberly Nguyen, WestEd

Micro-aggression and impostor phenomenon among racial/ethnic minorities in STEM (Virtual)
Devasmita Chakraverty, Indian Institute of Management Ahmedabad

3/29/22

Strand 12: Technology for Teaching, Learning, and Research
Roundtables-Using a simulated classroom to prepare elementary preservice teachers during and after the pandemic
8:00 AM-9:00 AM, Roundtable Room
Presider:

Using a Simulated Classroom to Prepare Elementary Preservice Teachers During and After the Pandemic
Jamie N. Mikeska, Educational Testing Service (ETS)
Heather Howell, ETS
Devon Kinsey, ETS

3/29/22

Strand 14: Environmental Education and Sustainability
Roundtables-Strand 14 Roundtable
8:00 AM-9:00 AM, Roundtable Room
Presider: Lynne Zummo, University of Utah,

Empirical research on school garden-based learning: A systematic review of the literature
Kathy Cabe Trundle, Utah State University
Rita Hagevik, The University of North Carolina At Pembroke

Incorporation of a Utility-Value Intervention into a Place-Based, Culturally Sustaining General Education Science Course
Michele L. Guannel, University of the Virgin Islands
Olivia Diana, University of the Virgin Islands
Angelisa Freeman, University of the Virgin Islands

Longitudinal effects of nature experiences on middle school students' environmental attitudes, interest and knowledge
Petra Bezeljak, Austrian Educational Competence Center for Biology, University of Vienna
Anna-Lena Neurohr, Austrian Educational Competence Center for Biology, University of Vienna
Andrea Möller, Austrian Educational Competence Center for Biology, University of Vienna

Places of Learning: Case studies on selected learning environments during COVID
David B. Zandvliet, Simon Fraser University

3/29/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions
SC-organized paper set-Technology & Computer Science
9:00 AM-10:30 AM, Kitsilano Ballroom A

Presider: Ruveyde Asli Kaya, Florida State University,

Exploring the Potency of Culturo-Techno-Contextual Approach on Achievement of Secondary School Students in Computer Networking
Esther O. Peter, ACEITSE-Lagos State University
Peter A. Okebukola, ACEITSE-Lagos State University
David G. Peter, Lagos State University
Deborah O. Agbanimu, ACEITSE-Lagos State University
Fred A. Awaah, University of Professional Studies, Accra
Franklin U. Onowugbeda, ACEITSE-Lagos State University
Olasunkanmi A. Gbeleyi, ACEITSE- Lagos State University
Adekunle I Oladejo, ACEITSE-Lagos State University
Ibukunolu A. Ademola, ACEITSE-Lagos State University
Imole Samson, Lagos State University

Flowchart and Algorithm as Difficult Concepts in Computer Studies: Can CTCA Come to the Rescue? (Virtual)
Deborah Oluwatosin Agbanimu, ACEITSE-Lagos State University
Peter A. Okebukola, ACEITSE-Lagos State University
Franklin U. Onowugbeda, ACEITSE-Lagos State University
Esther Oluwafunmilayo Peter, ACEITSE-Lagos State University
Adekunle Ibrahim Oladejo, ACEITSE-Lagos State University
Fred Awaah, University of Professional Studies Accra
Ibukunolu Adebiyi Ademola, ACEITSE-Lagos State University
Olasunkanmi Adio Gbeleyi, ACEITSE-Lagos State University
Francisca Ayobami Allename, Lagos State University, Nigeria

Student perceptions of computational thinking practices in a CT-integrated environmental science unit (Virtual)
Lexie Zhao, Northwestern University
Amanda N. Peel, Northwestern University
Michael Horn, Northwestern University
Uri Wilensky, Northwestern University

Will the Culturo-Techno-Contextual Approach Help Students' Understanding of Difficult Concepts in Computer Studies?
Daniel Ayomide Solarin, ACEITSE-Lagos State University
Peter A. Okebukola, ACEITSE-Lagos State University
Fred Awaah, ACEITSE-Lagos State University

Gamification: Toward the enhancement of self-efficacy in an introductory undergraduate biology laboratory course

David C. Owens, Georgia Southern University
Antonio P. Gutierrez de Blume, Georgia Southern University
Charles B. Hodges, Georgia Southern University
Kim Miles, Georgia Southern University
Cindi Smith-Walters, Middle Tennessee State University
Angela T. Barlow, University of Central Arkansas

3/29/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Related Paper Set-Supporting Teachers to Develop Expansive Learning Environments in Science and Engineering
9:00 AM-10:30 AM, Kitsilano Ballroom C
Discussant: Déana Scipio, IslandWood

Toward More Expansive Science Learning for Pre-Service Teachers
Jessica Watkins, Vanderbilt University
Natalie A De Lucca, Vanderbilt University

Centering Racialized Disciplinary Becoming in the Design of Teacher Professional Learning Communities (Virtual)
Christopher G. Wright, Drexel University
Rasheda Likely, Kennesaw State University
Sinead Meehan, Drexel University
Neissha Young, Drexel University
Mikhail Miller, Drexel University

Expanding Science Teacher Learning through Critical Relationality
Eli Tucker-Raymond, Boston University
Maria C. Olivares, Boston University
Brian Gravel, Tufts University
Amon Millner, Olin College of Engineering
Donna Peruzzi, Cambridge Public Schools

Exploring the "Wobbliness" of Teacher Candidates' Deficit and Anti-Deficit Framing
Kirsten K. Mawyer, University of Hawaii
Heather J. Johnson, Vanderbilt University

Elementary Science Teachers' Use of Representations to
Sarah Jaewon Lee, Vanderbilt University
Ashlyn Pierson, The Ohio State University
Danielle T. Keifert
Andrea Wentworth Henrie, Vanderbilt University
Heather J. Johnson, Vanderbilt University
Déana A. Scipio, IslandWood

3/29/22

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
SC-organized paper set-Coherent learning in NGSS curriculum and classrooms
9:00 AM-10:30 AM, Cambie
Presider: Elizabeth X. De Los Santos, University of Nevada, Reno,

Assessing Coherence Understanding of Energy as a Crosscutting Concept
Avraham Merzel, The Hebrew University of Jerusalem
Yaron Lehavi, The David Yellin College of Education

Examining Teachers' Attempts to Support Student Motivation in Middle Grades NGSS Classrooms
Katy Nilsen, WestEd
Christopher J. Harris, WestEd
David McKinney, University of Nevada, Las Vegas
Gwen Marchand, University of Nevada, Las Vegas

Influences on NGSS Instruction: Curriculum, Professional Learning, and District Support (Virtual)
Melissa Rego, WestEd
Ashley Iveland, WestEd
Charlie Mahoney, WestEd
Robert F. Murphy
Christopher J. Harris, WestEd

Responsive instructional design for students' coherence-seeking: Documenting episodes of principled improvisation in storyline enactment
Kevin Cherbow, Florida State University

3/29/22

Strand 5: College Science Teaching and Learning (Grades 13-20)
SC-organized paper set-Inclusive Pedagogy and Student Success
9:00 AM-10:30 AM, Parq Salon B
Presider: Tammy M. Long, Michigan State University,

Case Study Pedagogy as Inclusive Pedagogy: Entry Points for STEM Faculty to Build Inclusive Classrooms (Virtual)
Ally Hunter, University of Massachusetts, Amherst
Melissa Zwick, Stockton University

Did COVID-19 & Distance Learning Heighten Performance Disparities in General Chemistry? (Virtual)
Ted M. Clark, The Ohio State University
Glenn A Clark, Whirlpool Corporation

Examining Science Teacher Educators' Perspectives of Inclusion
Karen C. Goodnough, Memorial University
Saiqa Azam, Memorial University
Todd Milford, University of Victoria
Christine D. Tippett, University Of Ottawa

When Disaster Strikes: How New Majority Students Navigate STEM During a Global Disruption
Terrell R. Morton, University of Missouri - Columbia
Yejun Bae, University of Missouri
Courtney Ngai, University of Missouri-Columbia
Marcelle Siegel, University Of Missouri–Columbia
Charles Nilon, University of Missouri-Columbia
Ritesh Sharma, University of Missouri-Columbia

3/29/22

Strand 6: Science Learning in Informal Contexts
SC-organized paper set-Informal learning centers - Transition during crisis
9:00 AM-10:30 AM, Kitsilano Ballroom B
Presider: Jean-Philippe Ayotte-Beaudet, Université De Sherbrooke,

An adaptive design of a remote SEM authentic outreach activity
Ella Yonai, Weizmann institute of science
Ron Blonder, The Weizmann Institute Of Science

Online Learning in Museums One Year after COVID-19 Closures (Virtual)
Megan Ennes, University of Florida
Amanda Wagner-Pelkey, University of Florida

Perpetuation of privilege: Impacts of low pay on workforce equity and diversity in informal education
Kathryn Rende, North Carolina State University
M. Gail Jones, North Carolina State University
Megan Ennes, University of Florida

3/29/22

Strand 7: Pre-service Science Teacher Education
SC-organized paper set-Developing science teacher practices
9:00 AM-10:30 AM, Granville I
Presider: Bridget K. Mulvey, Kent State University,

Deep structures of student lesson plans at the end of the university teacher education
Tanja Mutschler, University of Potsdam
David Buschhüter, University of Potsdam
Andreas Borowski, University of Potsdam

How Preservice Secondary Science Teachers Support Sensemaking and Discourse Across Disciplines
Valerie Meier, University Of California - Santa Barbara
John Galisky, University Of California - Santa Barbara
Matthew D. Bennett, University Of California - Santa Barbara
Julie A. Bianchini, University Of California - Santa Barbara

Identifying the seeds of productive science discourse in undergraduate courses for pre-service science teachers
Hadeel Omar Edrees Dabbah, Ben-Gurion University of the Negev
Orit Ben Zvi Assaraf, Ben-Gurion University of the Negev
Ahmad Basheer, Academic Arab College for Education in Israel – Haifa
Naji Kortam, Academic Arab College for Education in Israel – Haifa

Planning vs. Instruction: Analysis of Preservice Secondary Science Teachers' Use of Practices and Crosscutting Concepts
John Galisky, University of California, Santa Barbara
Matthew D. Bennett, UCSB
Julie A. Bianchini, University Of California - Santa Barbara
Sarah Hough, University of California, Santa Barbara
Meghan Macias, University of California, Santa Barbara

3/29/22

Strand 8: In-service Science Teacher Education
SC-organized paper set-Teacher Learning across Science Disciplines
9:00 AM-10:30 AM, Parq Salon D (livestream 1)
Presider:

A Physics Case Study for Why Teachers Feel In- or Out-of-Field: Looking Beyond Educational Background (Virtual)
Kyla Smith, University of Oxford
Judith Hillier, University of Oxford
Sibel Erduran, University of Oxford

Biology Teachers' Knowledge Considerations and Pedagogical Goals When Designing Dataset Driven Instruction Units (Virtual)
Carmel Bar, Weizmann Institute of Science
Bat-Shahar Dorfman, Weizmann Institute of Science
Anat Yarden, Weizmann Institute Of Science

Capturing Collective Pedagogical Content Knowledge (cPCK) of Evolution for understand how biology teachers develop their personal PCKevo
Claudia Vergara, Alberto Hurtado University
Arlette Bassaber, Pontificia Universidad Catolica de Valparaiso
Paola Nuñez, Pontificia Universidad Catolica de Valparaiso
Beatriz Becerra, Pontificia Universidad Católica de Valparaiso
Harold Hurtado, pontificia Universidad Católica de Valparaíso
David Santibanez, Universidad Finis Terrae
Hernan Cofre, Pontificia Universidad Católica de Valparaíso

Chemistry Teacher Retention, Migration, and Attrition (Virtual)
Martin F Palermo, Stony Brook University
Angela M. Kelly, Stony Brook University
Robert Krakehl, Stony Brook University

3/29/22

Strand 8: In-service Science Teacher Education
SC-organized paper set-Exploring Elements of Elementary Science Teaching
9:00 AM-10:30 AM, Granville II
Presider: Jennifer Maguire, Virginia Tech,

Academic Impact for Preschoolers and Kindergarteners of Classroom and Family Science: A Randomized, Control-Group Study
Susanna E. Hapgood, University of Toledo
Joan Kaderavek, University Of Toledo
Peter Paprzycki, University Of Southern Mississippi
Charlene M. Czerniak, University Of Toledo
Scott Molitor, University Of Toledo
Grant Wilson, The University of Toledo
Jeanna Heuring, Keene State College

Elementary teachers' understandings of student cognitive engagement in science through witnessing models of classroom instruction
Patricia S. Bills, Oakland University
Imogen R Herrick, University of Southern California

Pathways to Critical Practice in Elementary Science Education
Emily Rose Seeber, University of Michigan
Christa Haverly, Northwestern University

Reconsidering Touch in an Elementary Science Sensemaking Space
Michelle N Brown, Pennsylvania State University

3/29/22

Strand 10: Curriculum and Assessment
SC-organized paper set-Curriculum and assessment for science learning
9:00 AM-10:30 AM, Parq Salon A
Presider: Catherine Mary Kenyon, Clemson University,

Cells in Context: Comparing Online vs. In-person Delivery
Dina Drits-Esser, Genetic Science Learning Center - University of Utah
Ann E Lambert, Genetic Science Learning Center - University of Utah
Jen C Taylor, Genetic Science Learning Center - University of Utah
Molly Malone, Genetic Science Learning Center - University of Utah
Sheila A Homburger, Genetic Science Learning Center - University of Utah
Kristin E Fenker, Genetic Science Learning Center - University of Utah
Louisa A Stark, Genetic Science Learning Center - University of Utah

Designing Biomimetic Robots: Examining Middle School Students' Knowledge in an Interdisciplinary Environment
Michael Cassidy, TERC
Debra Bernstein, TERC
Gillian Puttick, TERC
Fayette Shaw, Tufts University
Kristen Wendell, Tufts University
Ethan Danahy, Tufts University

Students' Science Learning Interests and Formal Biology Curriculum Emphases: Special Reference to Viruses in the COVID Pandemic Era
Vivien M. Chabalengula, University Of Virginia
Ian Nicolaides, Southern Illinois University

Three-Dimensional Learning Progression for Supporting Students' Knowledge-in-use Proficiency in High School Project-based Learning Chemistry Curriculum (Virtual)
Peng He, Michigan State University
I-Chien Chen, Michigan State University
Joseph S. Krajcik, Michigan State University

3/29/22

Strand 11: Cultural, Social, and Gender Issues
SC-organized paper set-Cultural Relevance in Science & STEM
9:00 AM-10:30 AM, Stanley
Presider: Greses Pérez, Tufts University,

A Select Physics Teachers Use of Empathy While Engaging in Culturally Relevant Practices
Clausell Mathis, University of Washington
Sherry A. Southerland, Florida State University

An exploration of Chinese Secondary Chemistry Teachers' Conceptions of Culturally Relevant Science Teaching
Xinying Yin, California State University-San Bernardino

Black women science teachers and anti-racist teaching: An argument for Historically Relevant Science Pedagogy (Virtual)
Alexis Riley, Teacher's College -Columbia University
Felicia Moore Mensah, Teachers College, Columbia University

Cultivating culturally sustaining STEM classrooms: A narrative inquiry case study of a science teacher
Khanh Q. Tran, Purdue University, West Lafayette
Selcen Guzey, Purdue University

3/29/22

Strand 12: Technology for Teaching, Learning, and Research
SC-organized paper set-Digital Multimedia and Computational Thinking to Support Science Learning and Teaching
9:00 AM-10:30 AM, Burrard
Presider: Peter Wulff, University of Potsdam,

Integrating Computational Thinking and Engineering Practices to Teach STEM: Examining Students' Attitudes About Physical Computing
Tyler S. Love, The Pennsylvania State University, Harrisburg
Julpa Rajyaguru, The Pennsylvania State University, Harrisburg

Integrating Computational Thinking as Part of Simulation-based Scientific Investigations with Volcanic Hazards and Risk
Christopher Lore, Concord Consortium
Hee-Sun Lee, The Concord Consortium
Amy Pallant, The Concord Consortium

Sensemaking Through Computational Thinking: Images of Computing as a Scientific Epistemic Practice in Teacher Learning
Gozde Tosun, Penn State University
Amy V. Farris, Penn State

Teaching digital multimedia design with eye-tracking – exploring a new teaching approach for student teachers (Virtual)
Axel Langner, Institute of Chemistry Education, Justus-Liebig-University Giessen, Germany
Nicole Graulich, Justus-Liebig Universität Giessen

3/29/22

Strand 13: History, Philosophy, Sociology, and Nature of Science
SC-organized paper set-Nature of Science and Higher Education
9:00 AM-10:30 AM, Parq Salon E (livestream 2)

How Teachers Used the Covid-19 Pandemic to Teach How Science Works
Jeanne L Brunner, University of Massachusetts Amherst
Ryan Summers, University of North Dakota

Learning in trajectories of participation: Nature of Science and Temporality in the Nature of Scientists (Virtual)
Ashwin Krishnan Mohan, Pennsylvania State University
Gregory J. Kelly, Pennsylvania State University

Re-thinking Science Education Using Non-linear Theories: Implications of Posthumanism on Ethics, Policy, and Practice (Virtual)
Sophia Jeong, The Ohio State University
Kathryn M. Bateman, Temple University
David P. Steele, Alder Graduate School of Education
Brandon Sherman, IUPUI

3/29/22

Strand 15: Policy, Reform, and Program Evaluation
Related Paper Set-Explorations of K-12 Integrated STEM Teaching
9:00 AM-10:30 AM, Kitsilano Ballroom D
Discussant: Erin Peters-Burton, George Mason University

The Current State of Integrated STEM Education: Comparing Science Content Areas and Grade-Levels (Virtual)
Emily A. Dare, Florida International University
Joshua A. Ellis, Florida International University
Gillian Roehrig, University of Minnesota
Elizabeth A. Ring-Whalen, St. Catherine University
Erin E. Peters-Burton, George Mason University

Understanding the Relationship between Context and Content Integration (Virtual)
Benny Mart Hiwatig, University of Minnesota Twin Cities
Joshua A. Ellis, Florida International University
Farah Faruqi, University of Minnesota Twin Cities
Khomson Keratithamkul, University of Minnesota Twin Cities
Elizabeth Forde, Florida International University
Gillian Roehrig, University of Minnesota
Erin E. Peters-Burton, George Mason University

Manifestations of Integration in Practice: A Case Study of Three Elementary Teachers' Integration of Engineering and Science
Farah Faruqi, University of Minnesota Twin Cities
Khomson Keratithamkul, University of Minnesota Twin Cities
Gillian Roehrig, University of Minnesota
Erin E. Peters-Burton, George Mason University

Yes, Math is There, but ...: Examining Mathematical Content in Integrated STEM (Virtual)
Elizabeth Forde, Florida International University
Latanya Robinson, Florida International University
Joshua A. Ellis, Florida International University
Emily A. Dare, Florida International University
Erin E. Peters-Burton, George Mason University

3/29/22

Publications Advisory Committee
Admin Symposium-NARST/NSTA Annual Research Worth Reading Recognition
9:00 AM-10:30 AM, Parq Salon C

Organizers
Shakhnoza Kayumova, University of Massachusetts-Dartmouth
Dante Cisterna, Educational Testing Service
Allison Antink-Meyer, Illinois State University
G. Michael Bowen, Mount Saint Vincent University, Halifax, Nova Scotia, Canada
Cynthia Crockett, Harvard-Smithsonian Center for Astrophysics
Knut Neumann, IPN–Leibniz Institute for Science and Mathematics Education, Kiel, Germany

Join us in congratulating this year's recipients of the NSTA Annual Research Worth Reading award. This award is given to three research groups whose 2018 JRST articles inspire excellent teaching innovations. This year's recipients are:

Harris, E. M., & Ballard, H. L. (2021). Examining student environmental science agency across school science contexts. Journal of Research in Science Teaching, 58(6), 906–934.

Puntambekar, S., Gnesdilow, D., Dornfeld Tissenbaum, C., Narayanan, N. H., & Rebello, N. S. (2021). Supporting middle school students' science talk: A comparison of physical and virtual labs. Journal of Research in Science Teaching, 58(3), 392–419.

Donovan, B. M., Weindling, M., Salazar, B., Duncan, A., Stuhlsatz, M., & Keck, P. (2021). Genomics literacy matters: Supporting the development of genomics literacy through genetics education could reduce the prevalence of genetic essentialism. Journal of Research in Science Teaching, 58(4), 520–550.

3/29/22

Multi-Strand-*Virtual Session E*
9:00 AM-10:30 AM, Parq Salon F (livestream 3)

"I'm too slow to get through Statistics": The Relationship between Statistics Anxiety and Academic Dishonesty (Virtual)
Pnina Steinberger, Orot Israel College of Education
Yovav Eshet, Zefat Academic College
Keren Grinautsky, Western Galilee College

The Importance of Family-level Variables to Evolution-related Perspectives and Careers in Black Undergraduates (Virtual)
Ross H. Nehm, Stony Brook University
Gena C. Sbeglia, Stony Brook University

What science teachers' autobiographies tell us about their own science education and career choices (Virtual)
Mariana Luzuriaga, University of San Andrés
Maria Eugenia Podesta, University of San Andrés
Melina Furman, University of San Andrés

Science Classrooms as Hostile Environments for Black Female Science Teachers (Virtual)
Olayinka Mohorn, Dominican University

3/29/22

Strand 1: Science Learning: Development of student understanding
Poster-Strand 1 Poster Session
10:45 AM-12:00 PM, Poster Space

101
Examining the crosscutting concept of patterns: An initial construct map in the context of ecosystems
Kristin L. Gunckel, University Of Arizona
Daniel L. Moreno, University of Arizona
Sean Tan, University of California Berkeley
Anna McPherson, American Museum of Natural History
Sara J. Dozier, CSU Long Beach
Linda Morell, University Of California, Berkeley

102
Exploring the concept of scientific civic engagement and its role in developing science literacy skills
Jenny M Dauer, University of Nebraska-Lincoln
Irfanul Alam, University of Colorado Boulder
Lisa A Corwin, University of Colorado Boulder

103
Investigating The Effects Of Instructional Support On Students' Inquiry-based Writing In Chemistry
Jan-Martin Österlein, University of Duisburg-Essen
Mathias Ropohl, University of Duisburg-Essen
Sebastian Habig, Paderborn University
Miriam Morek, University of Duisburg-Essen

104
Studies on Visualization in Science Classrooms: A Systematic Literature Review
Mijung Kim, University of Alberta
Qingna Jin, University of Alberta

3/29/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Poster-Strand 2 Poster Session
10:45 AM-12:00 PM, Poster Space

201
Factors Influencing Evolution Acceptance: A Systematic Literature Review and Meta-Analysis
Daniela Fiedler, Department of Biology Education, IPN - Leibniz Institute for Science and Mathematics Education, Kiel, Germany

202
Influence of Digital Learning Design Features and Self-Regulation on Students' Behavioral and Emotional Engagement (Virtual)
Daniel Laumann, University of Münster
Julia Welberg, University of Münster
Julian Alexander Fischer, Leibniz Institute for Science Education (IPN) Kiel
Tatjana Steinmann, Leibniz University of Hannover
Susanne M. Heinicke, University of Münster
Susanne Weßnigk, Leibniz University of Hannover
Knut Neumann, Leibniz Institute for Science Education (IPN) Kiel

203
Interacting with Luna: Scientific characters and 3rd graders' construction of relationships with Science (Virtual)
Deborah Cotta, Universidade Federal de Minas Gerais
Danusa Munford, Faculdade de Educacao - Universidade Federal de Minas Gerais
Elaine S. França, Centro Pedagógico (1-9 grades school) - Universidade Federal de Minas Gerais

204
Investigating the Ways Students Leverage Lived Experience to Explain Phenomena (Virtual)
Kraig A. Wray, Pennsylvania State University
Amy R. Pallant, The Concord Consortium
Hee-Sun Lee, The Concord Consortium
Scott McDonald, Pennsylvania State University

205
Learning in Multidisciplinary Teams in a Challenge-Based Learning Course
Canan Mesutoglu
Dürdane Dury Bayram-Jacobs, Eindhoven University of Technology

206
Make or Break Collaborative Disciplinary Engagement in Science: Managing Conceptual Uncertainty in Group Work (Virtual)
Harini Krishnan, Florida State University
Lama Jaber, Florida State University

Sherry A. Southerland, Florida State University

207
Scientists' and Teachers' Perceptions of Costs and Benefits in School-Based Citizen Science (Virtual)
Osnat Atias, University of Haifa
Ayelet Baram-Tsabari, Technion - Israel Institute of Technology
Ayelet Shavit, Technion - Israel Institute of Technology
Yael Kali, University of Haifa

208
Seasons in the Sun: Unpacking Seasons Lesson Approaches as Teachers Model Earth-based and Space-based Perspectives
Jennifer A. Wilhelm, University of Kentucky
Merryn Cole, University Of Nevada Las Vegas
Paula Ames, University of Kentucky
Jaden Hayes, University of Kentucky
Samantha Ringl, University of Kentucky

209
Social and material resources mediating young children's engagement in spatial sensemaking during summer engineering camp (Virtual)
Julia Plummer, Pennsylvania State University
Katie Nolan, Pennsylvania State University

210
Student Assertions in Science Discourse Spaces (Virtual)
Lauren Cabrera, Virginia Commonwealth University
Ananya Matewos, Saint Norbert College
Vivian Ali Zohery, University of Maryland - College Park
Doug Lombardi, University of Maryland, College Park

211
Supporting Discussion-based Science Practices for Special Education Students (Virtual)
Grace K. Baker, Penn State University
Emma J. Jacobson, Penn State University
Amy R. Pallant, The Concord Consortium
Hee-Sun Lee, The Concord Consortium
Scott McDonald, Pennsylvania State University

212
Supporting macro-ethical reasoning in college students' collaborative design work (Virtual)
Jennifer Radoff, University of Maryland-College Park
Chandra Turpen, University of Maryland-College Park
Fatima Abdurrahman, University of Maryland-College Park

213
The Impact of COVID-19 Lockdown on Parents and Adolescent Children in Relation to Science Learning (Virtual)
Ella Ofek-Geva, Weizmann Institute of Science
Michal Vinker, Department of Pediatrics and Department of Pediatric Endocrinology and Diabetes, Assuta Ashdod University Medical Center, Ashdod, Israel
Yonatan Yeshayahu, Department of Pediatrics and Department of Pediatric Endocrinology and Diabetes, Assuta Ashdod University Medical Center, Ashdod, Israel
David L. Fortus, Weizmann Institute Of Science

214
Critical pedagogy of place to enhance ecological engagement activities: Expanding "place" beyond the biophysical
Andrea E Weinberg, Arizona State University
Amanda Cicchino, Colorado State University
Meena M. Balgopal, Colorado State University
Laura B. Sample McMeeking, Colorado State University STEM Center

3/29/22

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies
Poster-Strand 3 Poster Session
10:45 AM-12:00 PM, Poster Space

301
A Case of Revealing Preservice Elementary Science Teachers' Understanding of Models and Modeling Through Reflections (Virtual)
Ayca K Fackler, University of Georgia

302
Assessing Elementary Students' Science Interests and Career Aspirations
M. Gail Jones, North Carolina State University
Katherine Chesnutt, Appalachian State University
Megan Ennes, University of Florida
Daniel Macher, Karl-Franzens-University of Graz
Manuela Paechter, Karl-Franzens-University of Graz

303
Developing Routines for Planning Elementary Science Investigations
Annabel J Stoler, Boston University
Eve Manz, Boston University
Chris Georgen, Boston University

304
Examining the Relationship between Preschool Teachers' Attitudes and Beliefs towards Science and Classroom Practice
Elica B. Sharifnia, University of Miami
Daryl Greenfield, University of Miami

305
Exploring the Nature of Challenges Preservice Elementary Teachers Experience about Matter Content and Content Teaching
Jamie N. Mikeska, Educational Testing Service (ETS)
Heena R. Lakhani, University of Washington
Dante Cisterna, Educational Testing Service

306
Science, Language, and Equity Practices: How Teachers Respond to Professional Learning Focused on Epistemic Agency (Virtual)
Emily C. Miller, University of Wisconsin Madison
Emily Reigh, Stanford
Maria C. Simani, University Of California, Riverside

307

Teachers' planned use of place-based stories rooted in students' everyday experiences of natural phenomenon

Melissa J. Luna, West Virginia University

3/29/22

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
Poster-Strand 4 Poster Session
10:45 AM-12:00 PM, Poster Space

401
Critical Discussions in Small Groups to Support the Design of Experiments
Takuya Matsuura, Hiroshima University
Urumi Hayashiuchi, Takehara City Educational Board

402
Innovative STEM curriculum to enhance students' engineering design skills and attitudes toward STEM (Virtual)
Meng-Fei Cheng, National Changhua University of Education
Yu-Heng Lo, National Changhua University of Education

403
Middle School Teachers' Self-efficacy for Teaching Science in a Computationally Rich Environment: A Mixed-Methods Study
Arif Rachmatullah, SRI International
Eric N. Wiebe, North Carolina State University

404
Science Instructional Practices: Comparison of Two Strategies for Students with Learning Disabilities (Virtual)
Gamze Karaer, University of Iowa
Macid Ayhan Melekoglu, Eskisehir Osmangazi University

405
Teachers' Conceptions of Phenomena in the Secondary Science Classroom
Daniel Pimentel, Stanford University

406
The Challenges of Teaching in Charter Schools and How They were Overcome During the COVID-19 Pandemic (Virtual)
Pamela Huff, Doctoral Candidate
Gail Jones, North Carolina State University

3/29/22

Strand 5: College Science Teaching and Learning (Grades 13-20)
Poster-Strand 5 Poster Session
10:45 AM-12:00 PM, Poster Space

501
Cultivating and supporting STEM faculty allyship
Thanh K. Le, Western Washington University
Regina Barber DeGraaff, Western Washington University
Leticia Romo, Chaffey College

502
Design and Outcomes for Computational Interest, Competency Belief, and Anxiety in "Science for Future Presidents"
Sheikh Ahmad Shah, Boston College
David W. Jackson, Boston College and Waltham (MA) Public Schools

503
Exploring of environmental engineering college students' social responsibility and problem solving through the SSI project (Virtual)
Yohan Hwang, Seoul National University
Kongju Mun, Dongduk Women's University
Kyung-Suk Cho, Ewha Womans University
Hyunju Lee, Ewha Womans University

504
Exploring the Perception of College Students in STEM Fields on Social Responsibility of Scientists and Engineers (Virtual)
Hyunju Lee, Ewha Womans University
Yuhyun Choi, Chungnam National University
Seung-Yong Ok, Hankyong National University
Chang-Hoon Nam, Daegu Gyeongbuk Institute of Science & Technology
Sungok Seren Shim, Ball State University
Yohan Hwang, Seoul National University
Yeonjoo Ko, Ewha Womans University
Kyungmi Lee, Ewha Womans University

505
Investigating learning assistants' use of questioning in the online setting of an inquiry-oriented physics course (Virtual)
Jianlan Wang, Texas Tech University
Yuanhua Wang, West Virginia University
Beth Thacker, Texas Tech University
Stephanie Hart, Texas Tech University

506
Preparing Graduate Students for Success: Validating Interdisciplinary Skill Development Needs (Virtual)
Nicole Campbell, Western University
Mohammed Estaiteyeh, Western University
Isha DeCoito, Western University

507
Student Participation and Self-Efficacy in Communities of Practice in Remote Undergraduate Physics Laboratories
Drew Jason Rosen, University of Maine Stony Brook University
Angela M. Kelly, Stony Brook University

508
Supporting New Research on Teaching Professional Development for Graduate Student: Progression and Personal/Professional Benefits (Virtual)
Gili Marbach-Ad, University Of Maryland
Patrick Sheehan, University Of Maryland
Bridgette Heine, University Of Maryland
Grant E. Gardner, Middle Tennessee State University
Judith S. Ridgway, The Ohio State University
Kristen Miller, University of Georgia
Elisabeth Schussler, University Of Tennesse

509
The Interconnectedness of Chemical contents – a Challenge for Teacher Training
Marina Regina Birkenstock, University of Kassel
David S. Di Fuccia, University of Kassel

510
Oral Communication in Postsecondary Science Education: Relationship between Dimensions of Attitude and Students' Oral Skills
Caroline Cormier, Cégep André-Laurendeau
Simon Langlois

3/29/22

Strand 6: Science Learning in Informal Contexts
Poster-Strand 6 Poster Session
10:45 AM-12:00 PM, Poster Space

601
"We're Not that Different": Typologies of Guests' Relationships to Museum Objects via Mechanic Assemblage within a Dinosaur Gallery (Virtual)
Joshua Cruz, Texas Tech University
Rebecca Hite, Texas Tech University
Richard C. Velasco, University of Iowa

602
Peer-to-Peer Seminars: Proposal to Use Peers and Structure to Promote Student Learning at Research Seminars (Virtual)
Elizabeth W Kelley, University of Chicago

603
Social Network Analysis as a Tool to Operationalize Communities of Practice and Document Social Learning
K. C. Busch, North Carolina State University
Lynn Chesnut, North Carolina State University

604
Using Augmented Reality (AR) to Bring the Past to Life in Informal Science Learning
Imogen R Herrick, University of Southern California
Gale Sinatra, University of Southern California
Alana Kennedy , University of Southern California
Benjamin Nye, University of Southern California
Bill Swartout, University of Southern California
Emily Lindsey, The La Brea Tar Pits Museum

3/29/22

Strand 7: Pre-service Science Teacher Education
Poster-Strand 7 Poster Session
10:45 AM-12:00 PM, Poster Space

701
Impact of Inquiry Lesson Experiences on Development of Preservice Elementary Teachers' Effective Science Teaching Beliefs
Kelsey Beeghly, University of Central Florida

702
Participating in online Teacher Learning Communities as a Tool for Pre-Service Teacher Education (Virtual)
Loucas T. Louca, European University-Cyprus
Theopisti Skoulia, European University-Cyprus

703
Teaching as enactment of habitus: Preparing preservice science teachers for new ways of teaching science (Virtual)
Hildah K. Makori, Iowa State University

704
Understanding Elementary Preservice Teachers' Beliefs about the Importance and Value of the NGSS Science Practices
Elsun Seung, Indiana State University
Vance J. Kite, North Carolina State University
Soonhye Park, North Carolina State University
Aeran Choi, Ewha Womans University

705
Using a PCK lens to capture pre-service science teachers' internalized knowledge of Nature of Science
Louise Lehane, llehane@stangelas.nuigalway.ie

706
Preservice Science Teachers' Informal Reasoning Modes in Two Different Issue Contexts (Virtual)
Nilay Ozturk, Kirsehir Ahi Evran University
Kubra Yolacti-Kizilkaya, Kirsehir Ahi Evran University

3/29/22

Strand 8: In-service Science Teacher Education
Poster-Strand 8 Poster Session
10:45 AM-12:00 PM, Poster Space

801
Investigating Impacts of Professional Development on High School Physics Teachers' Collaboration and Lesson Planning (Virtual)
James B. Hancock, Alma College
Jack T Poling, Alma College

802
A Cross-Case Analysis of In-Service Science Teacher's Assessment Literacy in Model-Based Teaching
Alexis Gonzalez-Donoso, University of British Columbia
Samia Khan, University of British Columbia

803
An Online Professional Development Community (APTeach): Teacher Perception and Practice (Virtual)
Fatma Kaya, Middle Tennessee State University
Preethi Titu, Kennesaw State University
Siying Jiang, Stony Brook University
Jiecheng Song, Stony Brook University
Steven Berryhill, Middle Tennessee State University
Amanda S. Perez, Carnegie Mellon University
Chinmay Kulkarni, Carnegie Mellon University
Wei Zhu, Stony Brook University
David Yaron, Carnegie Mellon University
Greg Rushton, Middle Tennessee State University

804
Analyzing Teaching Perceptions of Utilizing a District Level Professional Learning Community to Identify Guaranteed Curriculum (Virtual)
Kristin E Mansell

805
Examine Chinese In-service Science Teachers' Views of Nature of Science
Yang Yang, Beijing Normal University
Qin Yan, Beijing Normal University
Jing Lin, Beijing Normal University

806
Exploration of Epistemic Orientation towards Teaching Science in a Longitudinal Professional Development Study
Sierra L. Morandi, Florida State University
Claudia Hagan, Georgia State University
Ellen M. Granger, Florida State University
Jennifer Schellinger, Florida State University
Sherry A. Southerland, Florida State University

807
Exploring Early Enactment Attempts for Integrating Engineering Design Practices in High School Biology
Jonathan Singer, University of Maryland, Baltimore County
Jacqueline Krikorian, Baltimore City Public Schools
Tory H. Williams, University of Maryland Baltimore County
Christopher Rakes, University of Maryland, Baltimore County
Julie Ross, Virginia Tech

808
Listening to Find Integrated STEM Discourse: Power and Positioning During a Teacher Professional Development STEM Activity (Virtual)
Andria C. Schwortz, University of Wyoming
Andrea C. Burrows, University Of Wyoming

809
Lived Experiences of K-12 Teachers Who Attended Professional Development Hosted By Informal Education Institutions
Vashunda Williams Warren, Dallas Baptist University

810
Professional Development Principles to Advance Socio-scientific Issue-oriented Science Education: The Case of British Columbia.
Travis T. Fuchs, The University of British Columbia
Anthony Clarke, The University of British Columbia

811
Questionnaire Measuring Teachers' Perception of Practical Work in Inclusive Physics Lessons
Laura Sührig, Department of Physics Education, Goethe University Frankfurt
Katja Hartig, Institute of Psychology, Goethe University Frankfurt
Roger Erb, Department of Physics Education, Goethe University Frankfurt
Albert Teichrew, Department of Physics Education, Goethe University Frankfurt
Jan Winkelmann, University of Education Schwäbisch Gmünd
Holger Horz, Institute of Psychology, Goethe University Frankfurt
Mark Ullrich, Institute of Psychology, Goethe University Frankfurt

812
Science Teachers' Interactions With and Conceptions of Curriculum Use (Virtual)
Byung-Yeol Park, University of Connecticut
Todd Campbell, University of Connecticut
Miriah Kelly, Southern Connecticut State University
Chester Arnold, University of Connecticut

813
Science teaching performance: investigating gender, qualification, and teaching experiences
Hiya M. Almazroa, Princess Nourah Bint Abdulrahman University
Eman M Alrwaythi, AlImam Muhammad Ibn Saud University
Fahad S. Alshaya, King Saud University

814
Teacher's Readiness to Promote Science-related Career Awareness Among Middle School Students
Regina Soobard, University Of Tartu
Ana Valdmann, University Of Tartu
Miia Rannikmae, University Of Tartu

3/29/22

Strand 10: Curriculum and Assessment
Poster-Strand 10 Poster Session
10:45 AM-12:00 PM, Poster Space

1001
Assessing the Inquiry Practices of Teachers in the Philippines (Virtual)
Dennis L. Danipog, National Institute for Science and Mathematics Education Development, University of the Philippines Diliman
Suzanne Rice, Assessment Research Centre, University of Melbourne
Zhonghua Zhang, Assessment Research Centre, University of Melbourne

1002
Implementation of the ALL for Science Framework Across Three Grade Levels
Nancy Moreno, Baylor College of Medicine
Alana Newell, Baylor College Of Medicine
Lollie Garay, Baylor College of Medicine
Misty Sailors, University of North Texas

1003
Relationships Among Teacher Beliefs About STEAM Education, Perceptions of School Climate, and Enacted Practices.
Jaymie Paige Stein, Fordham University
John Craven, Fordham University

1004
Video-based Instruments as Assessment Tool in Science Teacher Education: A Systematic Literature Review (Virtual)
Yuxi Huang, University of Georgia
Hatice Ozen Tasdemir, The University of Georgia

3/29/22

Strand 11: Cultural, Social, and Gender Issues
Poster-Strand 11 Poster Session
10:45 AM-12:00 PM, Poster Space

1101
Uncovering Sex and Gender Language in High School Biology Textbooks
Awais Syed, BSCS Science Learning
Dennis Lee, BSCS Science Learning
Monica Weindling, BSCS Science Learning
Sophie Arnold, New York University
Andrei Cimpian, New York University
Catherine Riegle-Crumb, University of Texas
Molly Stuhlsatz, BSCS Science Learning
Brian M. Donovan, BSCS Science Learning

1102
Intervention Highlights the Importance of Career Awareness Promotion on Students' Equal STEM Career Awareness Development
Tormi Kotkas, University Of Tartu
Jack B. Holbrook, University Of Tartu
Miia Rannikmae, University Of Tartu

1103
The new four-letter word, 'race': Exploring Teacher Positions within biology education and critical race theory.
Uchenna Emenaha, The University of Texas at San Antonio

1104
John Henryism: Exploration of Physiological Examination of College STEM, Cumulative Trauma, Allostatic Load.
Douglas Lee Hoston
Richard Lamb, University at Buffalo

1105
Effectiveness and Inclusivity: determining best physics and astronomy departments for women of colour (Virtual)
Jaimie Lauren Miller-Friedmann, University of Birmingham
Nicola Wilkin, University of Birmingham

1106
Exploring the prevalence of whiteness within science education using duoethnographic methods
Jennifer Jackson, Pennsylvania State University
Jonathan D. McCausland, Pennsylvania State University

1107
Faculty Awareness and Responsiveness to Inclusivity in STEM Classrooms (Virtual)
Grant E. Gardner, Middle Tennessee State University
Olena T James, Middle Tennessee State University
Sarah Bleiler-Baxter, Middle Tennessee State University
Gregory Rushton, Middle Tennessee State University
Fonya Crockett Scott, Middle Tennessee State University
Amanda Heath, Middle Tennessee State University
Theresa Ayangbola, Middle Tennessee State University

1108
Identifying the Methods District Science Coordinators Utilize to Monitor and Promote Equity
Shaugnessy McCann
Yamil Ruiz
Brooke A. Whitworth, Clemson University
Julie A. Luft, University of Georgia

1109
Instructor Impact on the Equity of Collaborative Small Groups in a Science Class
Mary Binzley, Grinnell College
Paul Hutchison, Grinnell College

1110
Examining Moments of Liberatory Design Possibility in Youth-centered Engineering Design Practice
Jacqueline Handley, University of Michigan

3/29/22

Strand 12: Technology for Teaching, Learning, and Research
Poster-Strand 12 Poster Session
10:45 AM-12:00 PM, Poster Space

1201
Applying the eye tracking method to analyze university leaners' learning and reasoning behaviors in the Augmented Reality Environment (Virtual)
Fang-Ying Yang, National Taiwan Normal University
Yi-Wen Hung, The Affiliated Senior High School of National Taiwan Normal University
Yuan-Li Liu, National Taiwan Normal University

1202
Automated Assessment of Students' Response to Free-response Items on Particulate Nature of Matter Utilizing AI
Gyeong-Geon Lee, Seoul National University
Jaeyong Lee, Seoul National University
Hun-Gi Hong, Seoul National University

1203
CryptoComics: Design of an Integrative STEM+C Transmedia Curriculum
Pavlo D. Antonenko, University Of Florida
Kara Dawson, University of Florida
Zhen Xu, University of Florida
Do Hyong Koh, University of Florida
Christine Wusylko, University of Florida
Amber Benedict, Arizona State University
Swarup Bhunia, University of Florida

1204
Exploring Science Student Learning Outcomes using Machine Learning Classifications During Online Sessions
Richard Lamb, East Carolina University
Knut Neumann, Leibniz Institute for Science Education (IPN) Kiel

1205
Investigating Differential Effects of a Digital 'Ladder of Learning' With Adaptive Support in Chemistry
Michelle Möhlenkamp, University of Duisburg-Essen
Helena Van Vorst, University of Duisburg-Essen
Sebastian Habig, University of Duisburg-Essen
Mathias Ropohl, University of Duisburg-Essen

1206
Scaffolding Scientific Argumentation in a Science Inquiry Unit (Virtual)
Kathryn Rupp, Northern Illinois University
Karyn Higgs, Northern Illinois University
M. Anne Britt, Northern Illinois University
Kathleen Easley, The Learning Partnership
Randi McGee-Tekula, The Learning Partnership
Steven McGee, The Learning Partnership

1207
School Leaders Learning How to Observe Science Teachers Using Equitable Discourse Through Virtual Reality
Len Annetta, East Carolina University
Matthew Militello, East Carolina University
Lynda Tredway, Institute for Educational Leadership
Lawrence Hodgkins, East Carolina University
Ken Simon, Institute for Educational Leadership
Jim Argent, East Carolina University

1208
The Science of Data Visualization Comprehension: Analysis of Seminal Theoretical Frameworks (Virtual)
Kristine A. Antonyan, University of Florida
Pavlo D. Antonenko, University Of Florida

1209
Tracing the Development of a Haptically-enabled Science Simulation (HESSs) for Force and Motion (Virtual)
James Minogue, North Carolina State University
Emily Brunsen, North Carolina State University
Tabitha Peck, Davidson College
David Borland, RENCI

1210
Was that Productive? Exploring Student-Student Verbal Interactions while Engaged with Virtual Learning Environments about Magnetism (Virtual)
Joey D Marion, North Carolina State University
James Minogue, North Carolina State University
Michaela O'Leary, North Carolina State University
Katee Finegan, North Carolina State University

3/29/22

Strand 13: History, Philosophy, Sociology, and Nature of Science
Poster-Strand 13 Poster Session
10:45 AM-12:00 PM, Poster Space

1301
Considering the conceptual role of compassion in socioscientific issues research
David C. Owens, Georgia Southern University
Dana L. Zeidler, University Of South Florida

1302
Developing Pre-Service Teachers' Understanding of the Distinctions Between Science and Engineering
Jacob Pleasants, University of Oklahoma
Jennifer C. Parrish, University of Northern Colorado
Anne Leak, Assistant Professor, High Point University

1303
EXPLORING THE COMPLEXITY OF STUDENT-CREATED MIND MAPS, BASED ON SCIENCE-RELATED CORE IDEAS
Helen Semilarski, Doctoral student
Regina Soobard, Research Fellow of Science Education
Jack Holbrook, Professor
Miia Rannikmae, Professor

1304
Moroccan Science Professors' Nature of Science's Understandings and Perceptions on its Instruction for Preservice Teachers
Farnaz Avarzamani, Mary Lou Fulton Teachers College, Arizona State University, Tempe, AZ
Mila Rosa Librea Carden, Mary Lou Fulton Teachers College, Arizona State University, Tempe, AZ
Peter Rillero, Mary Lou Fulton Teachers College, Arizona State University, Tempe, AZ
Florence Hamel, Gary Herberger Young Scholars Academy, Mary Lou Fulton Teachers College, Arizona State University, Tempe, AZ

3/29/22

Strand 14: Environmental Education and Sustainability
Poster-Strand 14 Poster Session
10:45 AM-12:00 PM, Poster Space

1401
Ambitious Science Teaching as a way of integrating place-based and systems-literacy learning
Madison Botch, Pennsylvania State University
Amy R. Pallant, The Concord Consortium
Hee-Sun Lee, The Concord Consortium
Scott McDonald, Pennsylvania State University

1402
Exploring 6th-Grade Students Model-Based Reasoning about Energy Flow Between Societal and Earth Systems
Laura Zangori, University Of Missouri
Laura B Cole, University of Missouri
Mohammad Dastmalchi, University of Missouri

1403
Exploring the Potential for Place-Based Ecology Lessons in Middle School Science Classes
Sara L. Salisbury, Middle Tennessee State University
Fonya Crockett Scott, MTSU

1404
Fourth Graders' Knowledge of Energy and Environmental Literacy and Application through Flashlight Design (Virtual)
Heidi Masters, University Of Wisconsin–La Crosse
Vanashri J. Nargund, New Jersey City University

1405
Unite for the environment: Examining the impact a sustainable livelihoods program on pro-environmental behaviors in Ugandan student households near a biodiversity hotspot (Virtual)
Sarah J. Carrier, North Carolina State University
Aimee B Fraulo, North Carolina State University
Corinne Kendall, North Carolina Zoo
Austin Leeds
Tinka John, UNITE
Elizabeth Folta, North Carolina Zoo
Kristen E Lukas, Cleveland Metro Parks Zoo

1406
Adolescent Framings of Climate Change, Psychological Distancing & Implications for Climate Change Concern and Behavior (Virtual)
Regina Ayala Chavez, North Carolina State University

K. C. Busch, North Carolina State University

3/29/22

Strand 15: Policy, Reform, and Program Evaluation
Poster-Strand 15 Poster Session
10:45 AM-12:00 PM, Poster Space

1501
Expression of Next Generation Science Standards in Picture Books (Virtual)
Kelly Marie Shepard, Illinois Institute of Technology

1502
Faculty Voices on the Implementation of Science Education Policy in Higher Education-A Case Study
Mercy Ogunsola-Bandele, National Open University Of Nigeria
Bamikole O. Ogunleye, National Open University Of Nigeria

3/29/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions
SC-organized paper set-Theoretical & Literature Review Papers
2:00 PM-3:30 PM, Kitsilano Ballroom A
Presider: Catherine Mary Kenyon, Clemson University,

Emotions in Science Learning and Teaching: A Systematic Review (Virtual)
Xiao Chen, East China Normal University
Sihan Xiao, East China Normal University

Fresh Air: Glowing Conspirations Towards Scientific Fluency
Hartley Banack, University of Northern British Columbia (UNBC)
Gerald Tembrevilla, Mount Saint Vincent University
Claire Robson, Adjunct Faculty at Simon Fraser University
Anne Robillard, Graduate Student, Department of Curriculum and Pedagogy, Faculty of Education, UBC

The motivational consequence of pattern-seeking fatigue
Elon Langbeheim, Ben-Gurion University of the Negev
Edit M. Yerushalmi, Weizmann Institute of Science

Transformative Science Education: A Review of Transformative Experience Theory
Kevin J Pugh, University of Northern Colorado

3/29/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions
SC-organized paper set-Distance/online Science Teaching & Learning
2:00 PM-3:30 PM, Kitsilano Ballroom D

Presider: Hadeel Omar Edrees Dabbah, Ben-Gurion University of the Negev,

Science Teaching Practices and Student Engagement in HyFlex Learning Environments
Hong H. Tran, University of Georgia
Yuxi Huang, University of Georgia
Cheng-Wen (Nuby) He, University of Georgia
Brooke A. Whitworth, Clemson University
Yamil Ruiz, Clemson University
Shaugnessy McCann, University of Georgia
Julie A. Luft, University of Georgia

Shifting to Distance Learning of Science in China and Israel: A Comparative Study of Students and Teachers
David L. Fortus, Weizmann Institute of Science
Jing Lin, Beijing Normal University
Shira Passentin, Weizmann Institute of Science

The effect of in-person vs. distance learning on the quality of students' learning
Julian A. Fischer, Leibniz Institute for Science Education (IPN) Kiel
Tatjana Steinmann, Leibniz University of Hannover
Daniel Laumann, University of Münster
Susanne Weßnigk, Leibniz University of Hannover
Knut Neumann, Leibniz Institute for Science Education (IPN) Kiel

3/29/22

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
SC-organized paper set-Discourse and argumentation in secondary science teaching
2:00 PM-3:30 PM, Parq Salon A
Presider: Imogen R Herrick, University of Southern California,

Argumentation with Summary Tables in geoscience learning
Brandin M Conrath, Pennsylvania State University
Kathryn M. Bateman, Temple University
Amy R. Pallant, The Concord Consortium
Hee-Sun Lee, The Concord Consortium
Scott McDonald, Pennsylvania State University

Discourse in Inquiry Science Classrooms (DiISC) Version 2.0: Developing a Validity Argument for a Secondary Science Classroom Observation Instrument (Virtual)
Elizabeth B Lewis, University of Nebraska–Lincoln
Lyrica L Lucas, University of Nebraska–Lincoln
Brandon A Helding, University of Nebraska-Lincoln
Amy Tankersley, University of Nebraska-Lincoln
Ana M Rivero, Seattle University
Elizabeth Hasseler, University of Nebraska-Lincoln
Dale R Baker, Arizona State University

Teachers' Instructional Vision and Practices around Promoting Productive Talk in Science Classrooms
Ozlem Akcil Okan, Florida State University
Miray Tekkumru Kisa, Florida State University

3/29/22

Strand 5: College Science Teaching and Learning (Grades 13-20)
SC-organized paper set-Collaborative Learning in Remote Contexts
2:00 PM-3:30 PM, Parq Salon B
Presider:

"It truly benefited me!": Surprising Learning Benefits for Collaborating Education and Engineering Undergraduates During COVID
Kristie S. Gutierrez, Old Dominion University
Jennifer Kidd, Old Dominion University
Min Jung Lee, Old Dominion University
Pilar Pazos, Old Dominion University
Krishna Kaipa, Old Dominion University
Stacie I. Ringleb, Old Dominion University
Orlando Ayala, Old Dominion University

Cyber Peer Led Team Learning (cPLTL) Supports Women in Science, Engineering, Technology, and Mathematics (STEM)
Mariah Claire Maxwell, Syracuse University
Jason R. Wiles, Syracuse University

Exploring the Impact of Peer-to-Peer Interactions on Learning and Course Performance in an Online Environment (Virtual)
Anshuman Swain, University of Maryland, College Park
Marcia Shofner, University of Maryland, College Park
William F Fagan, University of Maryland, College Park
Gili Marbach-Ad, University Of Maryland, College Park

Student In-The-Moment Learning in LA-Facilitated Interactions in Undergraduate Chemistry and Physics Courses
Jessica Karch, Tufts University
Ira Caspari, Tufts University

3/29/22

Strand 6: Science Learning in Informal Contexts
SC-organized paper set-Informal learning in the community
2:00 PM-3:30 PM, Parq Salon D (livestream 1)
Presider: Wanja Gitari, University of Toronto,

Measuring Electro Dermal Activity (EDA) to detect and identify emotional engagement during family science activities
Neta Shaby, Ben Gurion University of the Negev
Dana Vedder-Weiss, Ben-Gurion University Of the Negev, Israel

Youth Environmental Science Learning and Agency: a Unifying Lens Across Community and Citizen Science Settings
Ana I. Benavides Lahnstein, Natural History Museum, London, UK
Heidi L. Ballard, University of California, Davis, CA, USA
Maryam Ghadiri Khanaposhtani, University of California, Davis, CA, USA
Julia Lorke, IPN - Leibniz Institute for Science and Mathematics Education, Kiel, Germany
Christothea Herodotou, Open University, Milton Keynes, UK
Annie E. Miller, California Academy of Sciences, San Francisco, CA, USA
Sasha Pratt-Taweh, Natural History Museum, London, UK
Jessie Jennewein, Natural History Museum of Los Angeles County, CA, USA
Maria Aristeidou, Open University, Milton Keynes, UK
Nashwa Ismail, Open University, Milton Keynes, UK

Youth Participatory Action Research: Positioning Science Learning as and for Community Participation (Virtual)
Steven Worker, University Of California
Martin H. Smith, University Of California
Sally Neas, Graduate Student, University of California, Davis
Car Mun Kok, 4-H Youth Development Advisor, University of California, Agriculture and Natural Resources
Dorina Espinoza, Youth, Families and Communities Advisor, University of California, Agriculture and Natural Resources

3/29/22

Strand 7: Pre-service Science Teacher Education
SC-organized paper set-Integrating Engineering into science education
2:00 PM-3:30 PM, Granville I
Presider:

Placing Empathy at the Center of Engineering: Design Thinking Embraced by Preservice Teachers for Engineering Design (Virtual)
Myunghwan Shin, California State University, Fresno
Jane J. Lee, Michigan State University

The Importance of Enactive Mastery Experiences: Teaching Engineering Self-Efficacy in a Pandemic
Matthew P. Perkins Coppola, Purdue University Fort Wayne

Using Card Sort Epistemic Network Analysis to Explore Preservice Teachers' Ideas about the Nature of Engineering
Jennifer C. Parrish, University of Northern Colorado
Jacob Pleasants, University of Oklahoma
Joshua Reid, Middle Tennessee State University
Bridget K. Mulvey, Kent State University
Erin E. Peters-Burton, George Mason University

3/29/22

Strand 8: In-service Science Teacher Education
SC-organized paper set-Professional Learning for STEM
2:00 PM-3:30 PM, Kitsilano Ballroom B
Presider: Venkat Rao Vishnumolakala, Curtin University,

How some early-career STEM teachers achieved agency during the COVID-19 pandemic
Meena M. Balgopal, Colorado State University
Elizabeth Diaz-Clark, Colorado State University
Andrea Weinberg, Arizona State University
Laura B. Sample McMeeking, Colorado State University
Diane Susan Wright, Colorado State University
Danielle E. Lin Hunter, Colorado State University

STEM Labs: The Future of Professional Development for Early STEM
Hope K. Gerde, Texas A&M University
Gary E. Bingham, Georgia State University
Melody Kung, Georgia State University
Arianna Pikus, Michigan State Univsersity
Hannah Etchison, Georgia State University

What Works in K-12 STEM Professional Development Programs?: A Meta-Analysis of its Impacts on Teachers and Students
Hye Sun You, Arkansas Tech University
Sunyoung Park, California Lutheran University
Minju Hong, University of Georgia

Teaching Science for Social Justice Using an Identity Framework
Katherine Wade-Jaimes, University of Nevada
Rachel D. Askew, Vanderbilt University

3/29/22

Strand 10: Curriculum and Assessment
SC-organized paper set-Educative features and implementations of NGSS-aligned curricula
2:00 PM-3:30 PM, Granville II
Presider: Cari F. Herrmann Abell, BSCS Science Learning,

Proposing a Framework to Analyze Educative Features in NGSS-aligned Science Curricular Materials (Virtual)
Soo-Yean Shim, University of Illinois at Urbana Champaign
Kevin Hall, University of Illinois at Urbana Champaign
Tania Jarosewich, Conseo Group
Stina Krist, University of Illinois at Urbana-Champaign
Mon-Lin Monica Ko, University of Illinois at Chicago
Barbara Hug, University of Illinois at Urbana–Champaign

Learning to Teach with Storyline Curriculum Materials
Annie Allen, University of Colorado Boulder
Clarissa Deverel-Rico, University of Colorado Boulder
William R. Penuel, University of Colorado Boulder
Carol Pazera, University of Texas Austin

Variation in the Implementation of Educative Curriculum Materials for Teacher Educators in Two Course Contexts (Virtual)
Deborah L. Hanuscin, Western Washington University
Josie C. Melton, Western Washington University
Emily J. Borda, Western Washington University
Jamie N. Mikeska, Educational Testing Service (ETS)

Inequitable opportunities to learn: Frequency of inquiry-based teaching in the United States (Virtual)
Sara J. Dozier, Stanford University

3/29/22

Strand 11: Cultural, Social, and Gender Issues
SC-organized paper set-Diverse Student Conceptions of Science and Engineering
2:00 PM-3:30 PM, Kitsilano Ballroom C
Presider: Catherine Quinlan, Howard University, School of Education,

A Comparative Case Study Investigating Indigenous/Rural Elementary Students' Conceptions of Community Engineering
Rebekah Hammack, Montana State University
Tina Vo, University of Nevada- Las Vegas
Miracle Moonga, Montana State University

"We think this way as a society!": Community-level Science Literacy among ultra-Orthodox Jews (Virtual)
Ayelet Baram-Tsabari, Technion - Israel Institute of Technology
Lea Taragin-Zeller, Technion - Israel Institute of Technology
Yael Rozenblum, Technion - Israel Institute of Technology

Further Probe into Culture, Context and Scientific Explanations by Biology Students: An African Case Study (Virtual)
Peter A. Okebukola, ACEITSE- Lagos State University
Tunde Owolabi, ACEITSE-Lagos StateUniversity
Foluso O Okebukola, LASSED-Lagos State University

Students' Considerations of Epistemic Criteria and Subsequent Tensions in Mixed-gender Engineering Groups (Virtual)
Christina L. Baze, University of Arizona
María González-Howard, University of Texas at Austin

3/29/22

Strand 11: Cultural, Social, and Gender Issues
Symposium-Designing and Implementing Virtual Black STEM Counterspaces to Elevate Black Learners
2:00 PM-3:30 PM, Burrard
Discussant: ReAnna Roby, Vanderbilt University
Presider: Cailisha L. Petty, North Carolina A&T State University,

Panelists
Terrell R. Morton, University of Missouri - Columbia
Angela White, North Carolina A&T State University
Nehemiah Mabry, STEMedia
Justin Shaifer, FascinateSci
Natalie S. King, Georgia State University
Kilan Ashad-Bishop, University of Miami, IndentifySTEM
Kelly Knight, George Mason University
Rachedia Lewis, University of Georgia
Cailisha L. Petty, North Carolina A&T State University
ReAnna S. Roby, Vanderbilt University

3/29/22

Strand 12: Technology for Teaching, Learning, and Research
SC-organized paper set-Fostering scientific inquiry through applications of technology
2:00 PM-3:30 PM, Cambie
Presider: Lisa Lundgren, Utah State University,

Cutting-edge Evolution Research Made Available to High-school Students: Assessing Students' Views of Scientific Inquiry (Virtual)
Bat-Shahar Dorfman, Weizmann Institute of Science
Amir Mitchell, Program in Systems Biology, University of Massachusetts Medical School, Worcester, Massachusetts, United States of America, Program in Molecular Medicine, University of Massachusetts Medical School, Worcester, Massachusetts, United States of America
Orna Dahan, Department of Molecular Genetics, Weizmann Institute of Science, Rehovot, Israel
Anat Yarden, Weizmann Institute Of Science

Research of Online Scientific Inquiry with/without Computer Simulation on 8th Graders' Performance of Scientific Inquiry
Ren-Jye Chou, Institute of Education National Yang Ming Chiao Tung University
Hsiao-Ching She, Institute of Education National Yang Ming Chiao Tung University
Meng Jun Chen, Institute of Education National Yang Ming Chiao Tung University

Technology-enhanced Inquiry-based Learning: Facilitating Motivation to Learn Science Among Elementary School Students
Tamar Ginzburg, Technion - Israel Institute of Technology
Miri I. Barak, Technion - Israel Institute Of Technology

3/29/22

Strand 13: History, Philosophy, Sociology, and Nature of Science
SC-organized paper set-Sociocultural and socio-scientific issues
2:00 PM-3:30 PM, Stanley
Presider: Valarie L. Akerson, Indiana University,

Developing Argumentation Skills on Socio-Scientific Issues through Evaluating Digital Sources and Engaging in Reflective Discussions
Shaghig Garo Chaparian, New York University
Saouma B. Boujaoude, American University Of Beirut

Effects of Subsuming Standards-based Objectives within the SSI Framework on Content Acquisition and Global Citizenship
Karrie A. Wikman, University of South Florida

Identifying Evidence of Student Global Discourse in Socioscientific Issues Research
Mary E. Short, The George Washington University

University Biology Students' COVID-19 Decisions: The Interconnected Influence of COVID-19 Science Perceptions and Sociocultural Membership
Benjamin C Herman, Texas A&M University
Michael P Clough, Texas A&M University
Asha Rao, Texas A&M University
Ben Janney, Texas A&M University
Alex Sobotka, Texas A&M University
Sarah Poor, Texas A&M University
Aaron Kidd, Texas A&M University

3/29/22

Strand 14: Environmental Education and Sustainability
Symposium-Preparing Pre-College Students to Solve Emerging Interdisciplinary Problems: Integrating Life Science and Engineering in Classrooms
2:00 PM-3:30 PM, Parq Salon E (livestream 2)
Discussant: Emily A. Dare, Florida International University
Presider: Erin M. Furtak, University Of Colorado,

Panelists
Christine M. Cunningham, Pennsylvania State University
Gregory J. Kelly, Pennsylvania State University
Debra Bernstein, TERC
Michael Cassidy, TERC
Selcen Guzey, Purdue University
Lynn A. Bryan, Purdue University
Nancy B. Songer, University of Utah
Kirby Whittington, The University of Utah
Erin M. Furtak, University Of Colorado
Emily A. Dare, Florida International University

3/29/22

Publications Advisory Committee
Admin Symposium-Publishing, Reviewing, and Writing for JRST
2:00 PM-3:30 PM, Parq Salon C

Panelists
Felicia Moore Mensah, Teachers College, Columbia University
Troy Sadler, University of North Carolina at Chapel Hill
Li Ke, University of North Carolina at Chapel Hill

3/29/22

Multi-Strand-*Virtual Session F*
2:00 PM-3:30 PM, Parq Salon F (livestream 3)

Adaptation and Validation of a Questionnaire for Measuring Teachers' Views on Nature of Science (Virtual)
Rachel Takriti, United Arab Emirates University
Hassan H. Tairab, United Arab Emirates University
Sibel Erduran, University of Oxford
Ebru Kaya, Bogazici University
Najwa Alhosani, United Arab Emirates University
Lutfieh M Rabbani, United Arab Emirates University
Iman AlAmirah, United Arab Emirates University

Design of Elementary, Middle School and Secondary Science Methods Courses by Prospective Science Teacher Educators: Contents, Decision Making Process and Challenges (Virtual)
Jose M. Pavez, University of Georgia

Preservice Science Teachers' Implementation and Self-Efficacy About The Science And Engineering Practices (Virtual)
Fatma Kaya, Middle Tennessee State University
Lisa A. Borgerding, Kent State University
Shannon L. Navy, Kent State University

3/29/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions
SC-organized paper set-Socioemotional Factors in Science Teaching & Learning
3:40 PM-5:10 PM, Kitsilano Ballroom D
Presider: Adrian Adams, University of Utah,

Curriculum-Aligned Instruction and Formative Assessments: Promote Students' Academic and Social-Emotional Learning (Virtual)
I-Chien Chen, Michigan State University
Tingting Li, Michigan State University
Selin Akgun
Emily C. Adah Miller, University of Wisconsin Madison
Joseph S. Krajcik, Michigan State University
Barbara Schneider, Michigan State University

How do immigrant students' self-theories affect PISA 2018 science achievement in three Anglophone countries?
Sibel KAYA, Kocaeli University
Nurullah Eryilmaz, University of Bath, UK
Dogan Yuksel, Kocaeli University, Turkey

Reducing Anxiety and Promoting Meaningful Learning of Difficult Biology Concepts: Can CTCA be a Fix?
Franklin U. Onowugbeda, ACEITSE – Lagos State University
Peter A. Okebukola, ACEITSE – Lagos State University
Deborah Oluwatosin Agbanimu, ACEITSE – Lagos State University
Fred A. Awaah, University of Professional Studies Accra
Ibukunolu Adebiyi Ademola, ACEITSE – Lagos State University
Olasunkanmi Adio Gbeleyi, ACEITSE- Lagos State University
Adekunle Ibrahim Oladejo, ACEITSE – Lagos State University
Esther Oluwafunmilayo Peter, ACEITSE – Lagos State University
Adeleke Micha Ige, ACEITSE – Lagos State University

Science Learning, Theatre, and Practices of Respect: Generative Engagement through Embodying Science in Urban Elementary Classrooms (Virtual)
Rebecca Kotler, University of Illinois at Chicago
Maria Varelas, University Of Illinois At Chicago
Nathan Phillips, University Of Illinois At Chicago
Rachelle Tsachor, University Of Illinois At Chicago
Rebecca Woodard, University Of Illinois At Chicago
Amanda Diaz, University Of Illinois At Chicago
Meghan Rock, University Of Illinois At Chicago
Zachary Sabitt, University Of Illinois At Chicago

Using ML-PBL Teaching Practices to Support Student Sensemaking and Social-Emotional Learning in Elementary Science Classrooms

Selin Akgun, Michigan State University
I-Chien Chen, Michigan State University
Tingting Li, Michigan State University
Emily C. Miller, University of Wisconsin Madison
Joseph S. Krajcik, Michigan State University
Susan K. Codere, MSU CRETE for STEM

3/29/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Related Paper Set-The Influence of Religious Identity in Evolution Education
3:40 PM-5:10 PM, Parq Salon A
Discussant: M. Elizabeth Barnes, Department of Biology, Middle Tennessee State University, USA
Presider: Daniela Fiedler, Department of Biology Education, IPN - Leibniz Institute for Science and Mathematics Education, Kiel, Germany,

The Influence of Religious Identity in Evolution Education - An Introduction to the Related Paper Set
Daniela Fiedler, Department of Biology Education, IPN - Leibniz Institute for Science and Mathematics Education, Kiel, Germany
M. Elizabeth Barnes, Department of Biology, Middle Tennessee State University, USA

A 5-year Analysis of the Impact of Religion and Political Views on Acceptance of Evolution (Virtual)
Ryan Dunk, School of Biological Sciences, University of Northern Colorado, USA
Jason R. Wiles, Department of Biology, Syracuse University, USA

Religious Cultural Competence in Evolution Education and its Association with Changes in Student Acceptance of Evolution across the United States
M. Elizabeth Barnes, Department of Biology, Middle Tennessee State University, USA
Hayley Dunlop, Ohio State University Medical School, USA
Julie Roberts, Psychology Department, Northwestern University, USA
K. Supriya, Center for Education Innovation and Learning in the Science, University of California Los Angeles, USA
Sam Maas, School of Life Sciences, Arizona State University, USA
Baylee Edwards, School of Life Sciences, Arizona State University, USA
Yi Zheng, School of Life Sciences, Arizona State University, USA
Sara Brownell, School of Life Sciences, Arizona State University, USA

Evolution Education in Light of the Conception of Religious Science Teachers and Scientists towards Evolution and Religion (Virtual)
Reut Stahi-Hitin, Department of Science Teaching, Weizmann Institute of Science, Rehovot, Israel
Anat Yarden, Department of Science Teaching, Weizmann Institute of Science, Rehovot, Israel
Daniela Fiedler, Department of Biology Education, IPN - Leibniz Institute for Science and Mathematics Education, Kiel, Germany

Sources of Validity Evidence for Evolution Acceptance of Creationists: A Matter of Microevolution and Macroevolution
Anna Beniermann, Department of Biology Education, Humboldt-Universität zu Berlin, Berlin, Germany
Alexandra Moormann, Museum für Naturkunde – Leibniz Institute for Research in Evolution

and Biodiversity, Berlin, Germany
Daniela Fiedler, Department of Biology Education, IPN - Leibniz Institute for Science and Mathematics Education, Kiel, Germany
K. Supriya, Center for Education Innovation and Learning in the Science, University of California Los Angeles, USA
Sam Maas, School of Life Sciences, Arizona State University, USA
Baylee Edwards, School of Life Sciences, Arizona State University, USA
Yi Zheng, School of Life Sciences, Arizona State University, USA
Sara Brownell, School of Life Sciences, Arizona State University, USA

3/29/22

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
SC-organized paper set-Modelling-based curriculum in secondary classrooms
3:40 PM-5:10 PM, Parq Salon B
Presider: Stephen L. Thompson, University of South Carolina,

Defining a Research Agenda for OpenSciEd Curriculum Materials
Kevin W. McElhaney, Digital Promise
Anthony Baker, Digital Promise
Babe Liberman, The Opportunity Trust
Zareen Kasad, Digital Promise
Carly Chillmon, Digital Promise
Jeremy Roschelle, Digital Promise
Tina Vo, University of Nevada- Las Vegas

Exploring Secondary Students' Explanations And Ideas On Evolution In A Modelling-based Task
Blanca Puig Mauriz, University of Santiago de Compostela
Noa Ageitos Prego

Teachers' Use and Adaptation of a Model-based Climate Curriculum: A Three-year Longitudinal Study
Kimberly Carroll Steward, University Of Nebraska - Lincoln
Cory T. Forbes, University Of Nebraska–Lincoln
Mark Chandler , NASS GISS LAB/Columbia University

3/29/22

Strand 5: College Science Teaching and Learning (Grades 13-20)
SC-organized paper set-Faculty Perceptions of Instruction and Teaching Professional Development
3:40 PM-5:10 PM, Parq Salon C
Presider: Emily M. Walter, California State University, Fresno,

Development of Multidimensional Framework for Exploring Undergraduates' Conceptions of Studying Science: Student and Faculty Perspectives
Angela N. Google, University of South Alabama
Jeremiah Henning, University of South Alabama
Anna S. Grinath, Idaho State University
Grant E. Gardner, Middle Tennessee State University

Limited or Complete? Conceptions of Teaching and Learning for STEM Teaching vs. Research Faculty
Veronika Rozhenkova, University of California, Irvine
Lauren Snow, University of California, Irvine
Brian Sato, University Of California, Irvine
Natascha Trellinger Buswell, University Of California, Irvine

Managing disruptions and dilemmas in online geoscience instruction during the COVID-19 pandemic (Virtual)
Kathryn M. Bateman, Temple University
Brandin Conrath, The Pennsylvania State University
Joy Ham, Temple University
Ellen Altermatt, Utah Education Policy Center
Anne Egger, Central Washington University
Ellen Iverson, Science Education Resource Center - Carleton College
Cathryn Manduca, Science Education Resource Center - Carleton College
Eric Riggs, Humboldt State University
Kristen St. John, James Madison University
Thomas F Shipley, Temple University

Pedagogical Complexity for Engineering Professors: Learning from a Pilot of the SPARK-ENG Professional Learning Program
Mijung Kim, University of Alberta
Janelle McFeetors, University of Alberta
Kerry Rose, University of Alberta
Qingna Jin, University of Alberta
Sreyasi Biswas
Jason Carey, University of Alberta
Janice Miller-Young, University of Alberta
Marnie Jamieson, University of Alberta
Samer Adeeb, University of Alberta

3/29/22

Strand 6: Science Learning in Informal Contexts
SC-organized paper set-Leveraging informal learning for formal learning
3:40 PM-5:10 PM, Kitsilano Ballroom B
Presider: Lin Li, University of Windsor,

Cognitive Load, Transfer, and Instructional Decision Making in Middle School STEM Integration
Angela M. Kelly, Stony Brook University
Monica Bugallo, Stony Brook University

Dioramas as a Place for Play and Early Science Learning: Exploring Teachers' Perspectives and Experiences
Jamie Wallace, American Museum of Natural History
Jenny D. Ingber, American Museum of Natural History
Sue Dale Tunnicliffe, University College London Institute of Education

Navigating Sociocultural Constraints that Influence African American Students' Participation in STEM: Deconstructing STEM Access
Lezly Taylor, Virginia Polytechnic Institute and State University
Brenda R. Brand, Virginia Tech University
George E. Glasson, Virginia Polytechnic Institute and State University
Anza Mitchell, Virginia Tech University
Takumi Sato, Virginia Tech

3/29/22

Strand 7: Pre-service Science Teacher Education
SC-organized paper set-Investigating Relationships between PCK Components
3:40 PM-5:10 PM, Granville I
Presider: Jessica Watkins, Vanderbilt University,

Influence of pre-service teachers' interactive use of content-specific knowledge components from students' point of view
Olutosin Solomon Akinyemi, University of the Witwatersrand
Adeniran G Adewusi , university of pretoria

Measuring the effects of scaffolds in a video-based learning environment for pre-service biology teachers
Marie Irmer, Biology Education, LMU Munich
Dagmar Traub, Biology Education, LMU Munich
Maria Kramer, Biology Education, LMU Munich
Christian Förtsch, Biology Education, LMU Munich
Birgit Jana Neuhaus, Biology Education, LMU Munich

Relationships Among Preservice Science Teachers' Discipline-, Domain- and Topic-Specific PCK - An Exploratory Study
Sarah Voss, Drake University
Jerrid W. Kruse, Drake University
Maryann Huey, Drake University

3/29/22

Strand 8: In-service Science Teacher Education
SC-organized paper set-Personal Factors Shaping Teacher Growth
3:40 PM-5:10 PM, Granville II
Presider: Vashunda Williams Warren, Dallas Baptist University,

Defining Teacher Ownership: A Science Education Case Study to Dertarmine Categories of Teacher Ownership
Ana Valdmann, Scientist
Miia Rannikmae, Professor
Jack Holbrook, Professor

Self-regulated Learning Professional Development for Science Teachers: A Systematic Literature Review (Virtual)
Daniel K. Capps, University of Georgia
Hong Tran, UGA
Timothy J. Cleary

What keeps rural science teachers in rural schools?: Teacher professional resilience
Diane Susan Wright, Colorado State University
Meena M. Balgopal, Colorado State University

A Review of Literature on Professional Learning for Science Teachers of Students with Learning Disabilities in the K-12 Setting
Sahrish S. Panjwani, University of Georgia

3/29/22

Strand 10: Curriculum and Assessment
SC-organized paper set-Methodological approaches to designing science assessment tasks
3:40 PM-5:10 PM, Parq Salon D (livestream 1)
Presider: Zoe E. Buck Bracey, BSCS,

Designing for Engineering: A Model for Integrating Engineering and Science NGSS Middle School Benchmark Assessments
Maia K. Binding, UC Berkeley - Lawrence Hall of Science
Lauren Brodsky, The Learning Design Group

Exploring the Comparability of Multiple-Choice and Constructed-Response Versions of Scenario-Based Assessment Tasks
Cari F. Herrmann Abell, BSCS Science Learning
Joseph M. Hardcastle, BSCS
George E. De Boer, American Association for the Advancement Of Science - Project 2061

Mining the Potential of "Wrong Answers" in Item Pairs to Describe Students' Alternative Thinking
Jim A Minstrell, Facet Innovations
Philip Hernandez, Stanford University
Min Li, University Of Washington
Ruth A. Anderson, FACET Innovations, LLC
Maria Araceli Ruiz-Primo, Stanford University
Xiaoming Zhai, University of Georgia
Dongsheng Dong, amazon
Klint Kanopka, Stanford University

Bayesian versus Frequentist Estimation for Item Response Theory (IRT) Models of Interdisciplinary Science Assessment
Hye Sun You, Arkansas Tech University
Seounghun Lee, University of Texas at Austin

3/29/22

Strand 11: Cultural, Social, and Gender Issues
SC-organized paper set-Gender and Sexual Identity Inclusivity in STEM
3:40 PM-5:10 PM, Burrard
Presider: Katerina Pia Günter, Uppsala University,

Don't forget about the LGBTQIA+: Toward a more robust queer theory in science education
Ashley N. Jackson, University Of Michigan
Darrell Allen, University Of Michigan

Education Research Experiences for Pre-Health Students Enhance Clinical Skills and Develop Awareness of LGBTQ+ Microaggressions
Laura A Weingartner, University of Louisville School of Medicine
Emily J Noonan, University of Louisville School of Medicine
M. Ann Shaw, University of Louisville School of Medicine
Linda C. Fuselier, University of Louisville

Supporting Secondary Science Teachers' Awareness of Gender Variance and Creation of Gender-Inclusive Lesson Plans
Stephanie S Eldridge, University of Georgia
Georgia Hodges, University Of Georgia

Gender Atypical? Examining the Gender Identities of Women in Engineering (Virtual)
Ursula Nguyen, The University of Texas at Austin
Catherine Riegle-Crumb, University of Texas

3/29/22

Strand 11: Cultural, Social, and Gender Issues
Related Paper Set-Raciolinguistic Perspectives in Science Education
3:40 PM-5:10 PM, Virtual Room O

Who gets to sound "like a scientist"? Scientific language as a process of authentication
Quentin C. Sedlacek, Southern Methodist University

Language ideologies in science course materials
Catherine Lemmi, California State University, Chico

Talking beyond science: Deconstructing whiteness and hegemonic language ideologies in preservice science teacher education
Caroline T. Spurgin, UC Santa Cruz
Sara Tolbert, Te Whare Wananga O Waitaha University of Canterbury

Language-as-race: Segregated science education and why it matters for efforts to include 'English learners' today (Virtual)
Kathryn L. Kirchgasler, University of Wisconsin–Madison
Cynthia T. Baeza, University of Wisconsin–Madison

3/29/22

Strand 12: Technology for Teaching, Learning, and Research
SC-organized paper set-Implementing Personalized Digital Platforms to Enhance Student Learning During the Pandemic
3:40 PM-5:10 PM, Cambie
Presider: Shane Tutwiler, University of Rhode Island,

Learning Analytics in a Designed Learning Platform During the Covid-19 Pandemic
Michael Adelani Adewusi, Lagos State University (ACEITSE), Ojo

Mobile Learning in the Physics Classroom – Should Students Bring or Schools Provide Smartphones? (Virtual)
Daniel Laumann, University of Münster
Malte Ubben, University of Münster
Susanne M. Heinicke, University of Münster
Stefan Heusler, University of Münster

The influence of a personalized online environment for chemistry teaching and learning on students' outcomes
Ehud Aviran, The Weizmann Institute Of Science
Ron Blonder, The Weizmann Institute Of Science

Using an Adaptive Learning System Teaching Engineering Students: Challenges and Opportunities
Frikkie George, Cape Peninsula University of Technology
Keith R. Langenhoven, University Of the Western Cape
Ekaterina Rzyankina, Cape Peninsula University of Technology

3/29/22

Strand 13: History, Philosophy, Sociology, and Nature of Science
SC-organized paper set-Nature of Science in K-12 Education
3:40 PM-5:10 PM, Kitsilano Ballroom C

Middle School Students' Understanding of Nature of Science and Their Metacognitive Awareness
Dilara Goren, Bogazici University
Ebru Kaya, Bogazici University

Structuralist or inferential: Which better helps to understand children comprehension of scientific representations?
Fernando Flores-Camacho, Universidad Nacional Autónoma de México
Leticia Gallegos-Cázares, Universidad Nacional Autónoma de México

Students' Understandings about Nature of Science and Their Argumentation Skills
Rola Khishfe, American University of Beirut

Teaching K12 Engineering — Educator's Views of Practices, Nature, and Knowledge
Brian D Hartman, Walla Walla University
Randy L. Bell, Oregon State University

3/29/22

Strand 15: Policy, Reform, and Program Evaluation
Related Paper Set-Supporting Expansive Conceptions of Science Teaching and Learning for Equity
3:40 PM-5:10 PM, Parq Salon E (livestream 2)
Discussant: Tiffany Neill, Oklahoma State Department of Education
Presider: Maya Garcia, Colorado Department of Education,

Design Principles, Change Theory, and Infrastructuring Needs for Implementation
Abby Rhinehart, University of Washington
Deb L. Morrison, University Of Washington
Philip L. Bell, University Of Washington
Maya Garcia, Colorado Department of Education
Tiffany Neill, Oklahoma State Department of Education

Science Education Leaders' Sense-making and Noticing for Equity
Riley Ceperich, University of California LA
Trang Tran, University of Colorado Boulder
Yamileth Salinas Del Val, University of Colorado Boulder
Kristen Davidson, University of Colorado Boulder

A Landscape Survey Analysis of the Potential for Equity-focused Science Education across the PK-12 Education System
Philip L. Bell, University Of Washington
Abby Rhinehart, University of Washington Seattle
Melissa Campanella, University of Colorado Boulder

Supporting Science Teachers in Using Student Experience Data to Support More Equitable Participation in Science Classrooms
Ali Raza, University of Colorado Boulder
William R. Penuel, University of Colorado Boulder
Yamileth Salinas Del Val, University of Colorado Boulder

3/29/22

Research Committee
Admin Symposium-How to Get Your Research Published in Science Education Journals
3:40 PM-5:10 PM, Stanley

Organizers
Saouma B. Boujaoude, American University Of Beirut
Dante Cisterna, Educational Testing Service
Ibrahim H. Yeter, National Institute of Education, Nanyang Technological University

Journal of Research in Science Teaching (JRST)
Felicia Mensah, Columbia University
Troy Sadler, University of North Carolina Chapel Hill

Science Education
Sherry Southerland, Florida State University
John Settlage, University of Connecticut

School Science and Mathematics (SSM)
Bridget Miller, University of South Carolina
Christie Martin, University of South Carolina

Journal of Science Teacher Education (JSTE)
Geeta Verma, University of Colorado, Denver
Todd Campbell, University of Connecticut
Wayne Melville, Lakehead University

Journal of Science Education and Technology (JSET)
Kent Crippen, University of Florida

Studies in Science Education (SSE)
Lucy Avraamidou, University of Groningen
Justin Dillon, University of Exeter

Science and Education (Virtual)
Sibel Erduran, Oxford University

Cultural Studies of Science Education
Catherine Milne, New York University
Christina Siry, University of Luxembourg

International Journal of Science Education (IJSE)
Gail Jones, North Carolina State University
Jan van Driel, The University of Melbourne

Research in Science Education (RSE)
Angela Fitzgerald, University of Southern Queensland
Kim Nichols, University of Queensland

Computers and Education
Rachelle S. Heller, George Washington University

Journal of the Learning Sciences
A. Susan Jurow, University of Colorado, Boulder, USA
Jianwei Zhang, University at Albany, State University of New York, USA

Canadian Journal of Science, Mathematics and Technology Education
Doug McDougall, OISE, University of Toronto, Canada

Asia-Pacific Science Education
Sonya Martin, Seoul National University

CBE-Life Science Education
Kimberly Tanner, San Francisco State University
Jeff Schinske, Foothill College

3/29/22

Awards Committee
Admin Symposium-A Celebration of NARST Award Recipients: A Discussion of the Future of Science Education, Session 1
3:40 PM-5:10 PM, Parq Salon F (livestream 3)
Presider: Noemi Waight, University at Buffalo,

Distinguished Contributions to Research Award (DCRA)
Noemi Waight, University at Buffalo
Marissa S. Rollnick, Wits University
Katherine L. McNeill, Boston College
Dana Vedder-Weiss, Ben-Gurion University Of the Negev, Israel
Jomo Mutegi, Old Dominion University

3/29/22

Strand 1: Science Learning: Development of student understanding
SC-organized paper set-Inscriptions in Science Learning
5:20 PM-6:50 PM, Parq Salon A
Presider:

A novel method for measuring problem-definition progression of middle schoolers: Use of student artifacts 1
Ferah Ozer, The University of North Carolina at Chapel Hill
Nihal Dogan, Bolu Abant Izzet Baysal University

Narrowing the Gap Between Experiments, Texts and Pictures – Investigation of an Extended Contiguity Principle (Virtual)
Paul Schlummer, Institute of Physics Education (IDP) at the University of Münster
Stefan Heusler, Institute of Physics Education (IDP) at the University of Münster
Daniel Laumann, Institute of Physics Education (IDP) at the University of Münster

Science Notebooks in Preschool Education
Elena Calderón-Canales, Instituto de Ciencias Aplicadas y Tecnología, Universidad Nacional Autónoma de México.
Leticia Gallegos-Cázares, Instituto de Ciencias Aplicadas y Tecnología, Universidad Nacional Autónoma de México.
Fernando Flores-Camacho, Instituto de Ciencias Aplicadas y Tecnología, Universidad Nacional Autónoma de México.

Students' Sensemaking Related to Mathematical Equations in A Biology Classroom (Virtual)
Desi, University of Minnesota
Cuc Vu
Gillian Roehrig, University of Minnesota
Anita Schuchardt, University of Minnesota

3/29/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions
SC-organized paper set-Early Childhood & Elementary Science Teaching & Learning
5:20 PM-6:50 PM, Parq Salon B
Presider: Amy V. Farris, Penn State,

Australian Primary School Students' Understandings about the Nature of Scientific Inquiry
Patricia D Morrell, The University of Queensland
Jana Visnovska, The University of Queensland
Jodie Miller, The University of Queensland

Elementary Teachers' Agency for Teaching Science and Engineering when Working Within and Against School Structures
Alison Mercier, University of Wyoming

Using Photovoice to Understand Children's Experiences and Environmental Science Learning at a Nature Preschool
Laura Dell, University of Cincinnati

Using the Scientific and Engineering Practices Observation Protocol (SciEPOP) to Explore Play-based Early Learning Environments
Alison R. Miller, Bowdoin College
Lauren P. Saenz, Bowdoin College

3/29/22

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies
Admin Symposium-Enhancing Science and Engineering in Preschool through Fifth Grade: A National Academies Consensus Study
5:20 PM-6:50 PM, Parq Salon D (livestream 1)

Panelists
Elizabeth A. Davis, University of Michigan
Amy Stephens, National Academies of Sciences, Engineering, and Medicine
Heidi B. Carlone, Vanderbilt University
Eve Manz, Boston University School of Education
Carrie Tzou, University of Washington Bothell
Carla Zembal-Saul, Penn State University
Lucy Avraamidou, University Of Groningen
Tia C. Madkins, The University of Texas At Austin
Felicia M. Mensah, Teachers College, Columbia University

3/29/22

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
SC-organized paper set-Pedagogical content knowledge for secondary science teachers
5:20 PM-6:50 PM, Parq Salon E (livestream 2)
Presider: Andrea Moeller, Unversity of Vienna,

Investigating a Chemistry Teacher's modeling-PCK in the Periodic Table Modeling-Based Instruction (Virtual)
Ya-Ping Tsao, National Taiwan Normal University Graduate Institute of Science Education
Mei-Hung Chiu, National Taiwan Normal University Graduate Institute of Science Education
Mao-Ren Zeng, National Taiwan Normal University Graduate Institute of Science Education
Yen-Tzu Liao, National Taiwan Normal University Graduate Institute of Science Education
Sin-Yun Syu, National Taiwan Normal University Graduate Institute of Science Education
Li-Ya Wang, National Taiwan Normal University Graduate Institute of Science Education

Pre-Service Biology Teachers' PCK about Scientific Reasoning (Virtual)
Leroy Großmann, Freie Universität Berlin
Merryn Dawborn-Gundlach, University of Melbourne
Jan H. Van Driel, University Of Melbourne
Dirk Krüger, Freie Universität Berlin
Moritz Krell, Leibniz Institute for Science and Mathematics Education (IPN)

The Impact of Assessment Change on Teachers' Orientations and PCK for High School Laboratory Practices
Vanessa Kind, Durham University
Helen Cramman, Durham University
Helen F Gray, Durham University

The Topic Specific PCK of Videos on the Big Idea, "What is Chemical Equilibrium" (Virtual)
Marissa S. Rollnick, Wits University
Stephen A. Malcolm, University of the Witwatersrand

3/29/22

Strand 5: College Science Teaching and Learning (Grades 13-20)
SC-organized paper set-Learning About Science, Engineering and Social Issues
5:20 PM-6:50 PM, Parq Salon C
Presider: Catherine Mary Kenyon, Clemson University,

College Students' Epistemological Beliefs about Medical Science and Trust in Science and Scientists during COVID-19 (Virtual)
Lisa A. Borgerding, Kent State University
Bridget K. Mulvey, Kent State University

Engineering students' self-efficacy and civic responsibility in a social innovation curriculum
Tiffanyrose Sikorski, George Washington University
Erica Wortham, George Washington University

Investigating graduate student and instructors' course experiences "Teaching and Learning Science for Social Justice"
Iesha Jackson, University of Nevada- Las Vegas
Tina Vo, University of Nevada- Las Vegas
Sabrina Barakat, UNLV
Nicole J. Thomas, University of Nevada, Las Vegas
Sarah York, UNLV
Abigale Ly, UNLV

Utilizing argument-driven inquiry with scaffolding to improve socioscientific argumentation in undergraduate students
Sarah Krejci, Bethune-Cookman University
Hector N Torres, Bethune-Cookman University
Raphael D Isokpehi, Bethune-Cookman University
Dana L Zeidler, University of South Florida

3/29/22

Strand 7: Pre-service Science Teacher Education
SC-organized paper set-Creating spaces and resources for high quality learning in pre-service teacher education
5:20 PM-6:50 PM, Granville I
Presider:

Examining Virtual Rehearsals and Practice Science Teaching as Support Systems for Rural Elementary Teacher Residents
Stephen L. Thompson, University of South Carolina
Amber Adgerson, University of South Carolina

Finding high-quality mentor feedback for science pre-service teachers
Caroline Hadley Long, University of Washington
Mark Windschitl, University Of Washington
Karin Lohwasser, University of California, Santa Barbara
Soo-Yean Shim, University of Illinois
Tammy Q. Tasker, Western Washington University

Learning to Teach During a Pandemic: Preservice Secondary Science and Mathematics Teachers' Use of Resources
Matthew D. Bennett, University of California, Santa Barbara
Valerie Valdez, University of California, Santa Barbara
Cameron Dexter-Torti, University of California, Santa Barbara
Donald McNish, University of California, Santa Barbara
Liliana Garcia, University of California, Santa Barbara
T. Royce Olarte, University of California, Santa Barbara
Sarah Hough, University of California, Santa Barbara
Sarah A. Roberts, University of California, Santa Barbara
Julie A. Bianchini, University of California, Santa Barbara

3/29/22

Strand 7: Pre-service Science Teacher Education
SC-organized paper set-Toward inclusive and just outcomes for diverse learners
5:20 PM-6:50 PM, Stanley
Presider: Karl G. Jung, University Of South Florida,

Challenges with Inclusive Teaching at Vocational Schools in Germany
Simone Rueckert, University of Duisburg-Essen
Helena Van Vorst, University of Duisburg-Essen

Cultivating Discourse of English Learners During the Enactment of Cognitively Demanding Work
Walter Aminger, University Of California, Santa Barbara Nevada State College

Preservice Teacher Noticing, Interpreting, Responding to Students' Sensemaking Resources for Equitable Access to Science Understanding
Judith A. Cooper-Wagoner, University of Arizona
Kristin L. Gunckel, University Of Arizona

The Paradox of Dedication: Agonistic interviews on preservice science teacher students' choice-narratives
Jeppe Langkjær, University College Copenhagen
Bjørn Friis Johannsen, University College Copenhagen
Maria Rejkjær Holmen, University College Copenhagen

3/29/22

Strand 8: In-service Science Teacher Education
SC-organized paper set-Teacher Learning and Practice during the Pandemic
5:20 PM-6:50 PM, Granville II
Presider: Jennifer Maguire, Virginia Tech,

Exploring Teachers' Experience and Implementation of the Science and Engineering Practices in Different Instructional Contexts
Cheng-Wen He, University of Georgia
Hong H. Tran, UGA
Yamil Ruiz
Shaugnessy McCann
Brooke A. Whitworth, Clemson University
Julie A. Luft, University of Georgia

Identification and characterization of the essential knowledge domains for online chemistry teaching during Covid-19 pandemic
Itsik Aroch, The Weizmann Institute of Science
Dvora Katchevich, The Weizmann Institute Of Science
Lili Orland?Barak, University of Haifa
Ron Blonder, The Weizmann Institute Of Science

The Experiences of Biology Teacher Coordinators Participating in a VPLC During the COVID-19 Crisis (Virtual)
Odelia Schrire, Technion
Dina Tsybulsky, Technion - Israel Institute Of Technology
Christine Ipsen, DTU

The role of professional learning communities (PLCs) in supporting chemistry teachers during the COVID-19 crisis (Virtual)
Anat Shauly
Gabriella Shwartz, Dr.
Shirly Avargil, Dr.

3/29/22

Strand 10: Curriculum and Assessment
SC-organized paper set-Teacher collaborative design of three-dimensional performance assessments
5:20 PM-6:50 PM, Kitsilano Ballroom A
Presider: Joi Merritt, James Madison University,

CoFee – Computer-based feedback design for written reflections in pre-service science teacher education
Peter Wulff, University of Potsdam
Lukas Mientus, University of Potsdam
Anna Nowak, University of Potsdam
Andreas Borowski, University of Potsdam

Examining the impact of using pilot data to support teachers in designing high quality three-dimensional performance assessments
Cathy Zozakiewicz, SNAP/SCALE
Jill A. Wertheim, Stanford University

Supporting Teachers' Capacity to Design for Coherent Assessment of Multidimensional Science Learning
Samuel Severance, University of California, Santa Cruz
Guadalupe Martinez, University of California, Santa Cruz

Teacher Agency in a Responsive Co-Design Process of 3D Performance Assessments
Jill Wertheim, Stanford Center for Assessment, Learning, and Equity (SCALE)
Miray Tekkumru Kisa, Florida State University
Ozlem Akcil Okan, Florida State University

3/29/22

Strand 11: Cultural, Social, and Gender Issues
SC-organized paper set-Innovation in Conceptual and Methodological Research Approaches
5:20 PM-6:50 PM, Cambie
Presider: John Settlage, UConn,

Art-based Methods and Signs of Science Capital: Approaching Young Children's Experiences and Relation to Science
Katia Bill Nielsen, Universtity of Copenhagen
Ene Ernst Hoppe, University of Copenhagen
Henriette T. Holmegaard, University Of Copenhagen

Ethnodance as a Critical Identity Tool for Black Students' Science Identity Construction
Mindy J. Chappell, University of Illinois at Chicago

Patchworking Critical and Cultural-Historical Activity Theoretical Analytics for Research in Science Education
Caroline T. Spurgin, UC Santa Cruz
Alexandra I. Race, UC Santa Cruz
Doris B. Ash, Univeristy of California Santa CruzC Santa Cruz

Inclusive Science Education: Sheltered Instruction for English Language Learner
Hajira Nusret
Saiqa Azam, Memorial University Of Newfoundland

3/29/22

Strand 12: Technology for Teaching, Learning, and Research
SC-organized paper set-Multimedia, Artificial Intelligence, and Augmented Reality in Teaching and Learning
5:20 PM-6:50 PM, Burrard
Presider: Cristian Merino, Pontificia Universidad Católica De Valparaíso,

A Bibliometric Analysis of Trends and Issues in Educational AI
Brian Abramowitz, University of Florida
Minyoung Lee, University of Florida
Pavlo Antonenko, University of Florida

An Eye-Tracking Study On Learning Representations In Organic Chemistry With Dynamic Signals In Instructional Videos
Marc Rodemer, IPN - Leibniz Institute for Science and Mathematics Education
Marlit A. Lindner, IPN - Leibniz Institute for Science and Mathematics Education
Julia Eckhard, Justus-Liebig-University Giessen
Nicole Graulich, Justus-Liebig Universität Giessen
Sascha Bernholt, IPN - Leibniz Institute for Science and Mathematics Education

Exploring Teachers' Conceptions of Artificial Intelligence in K-12 Science Education
Brian Abramowitz, University of Florida
Pavlo D. Antonenko, University Of Florida
Stephanie Killingsworth, University of Florida
Bruce MacFadden, University of Florida
Sadie Mills, University of Florida

Topic specific differences in supporting organic chemistry learning augmented reality based (Virtual)
Sebastian Keller, University of Duisburg-Essen
Sebastian Habig, FAU Erlangen-Nürnberg
Stefan Rumann, University Of Duisburg-Essen

3/29/22

Strand 13: History, Philosophy, Sociology, and Nature of Science
SC-organized paper set-Nature of Science in Teacher Education
5:20 PM-6:50 PM, Kitsilano Ballroom C
Presider:

"It's a lesson with no answer!": Understanding preservice teachers' lesson development using history of science (Virtual)
Wonyong Park, University of Southampton
Sibel Erduran, University of Oxford
Jinwoong Song, Seoul National University
Minchul Kim, Kongju National University

What is Physics? Considering Teachers' Epistemic Beliefs about Physics Knowledge
Ellen Watson, Brandon University

Teaching of NOSI in Outdoor Learning Environments in the Period of Covid-19 Pandemic (Virtual)
Eda Erdas Kartal, Kastamonu University
Gunkut Mesci, Giresun University

Pre-Service Chemistry Teacher's Beliefs regarding the use of Experiments and Nature of Science
Janne-Marie Bothor, University of Kassel
David S. Di Fuccia, University of Kassel

3/29/22

Strand 15: Policy, Reform, and Program Evaluation
SC-organized paper set-Standards
5:20 PM-6:50 PM, Kitsilano Ballroom B
Presider:

Developing a Framework for Identifying Key Innovations in Novel Science Programs: A Learning-by-Making Case Study
Benjamin S Mahrer, WestEd
Gary Weiser, WestEd
Linlin Li, WestEd
Laura Peticolas, Sonoma State University
Lynn Cominsky, Sonoma State University

Searching for Nature of Engineering in the Framework for K-12 Science Education (Virtual)
Hasan Deniz, University of Nevada Las Vegas
Erdogan Kaya, George Mason University
Ezgi Yesilyurt, Weber State University

Private Industry's Push and Pull: Is Computer Science Really for All?
Stefanie L. Marshall, University of Minnesota- Twin Cities
Ain Grooms, University of Iowa

Social Covenants as Contextual Mitigating Factors (CMFs)
Katie L Brkich, Georgia Southern University
Alejandro J. Gallard, Georgia Southern University
Wesley Pitts, Lehman College, CUNY
S. Lizette Ramos, University of Guadalajara
Maria A Rodriguez, University of Texas Rio Grande Valley

3/29/22

Awards Committee
Admin Symposium-A Celebration of NARST Award Recipients: A Discussion of the Future of Science Education, Session 2
5:20 PM-6:50 PM, Parq Salon F (livestream 3)
Presider: Noemi Waight, University at Buffalo,

Early Career Research Award (ECRA), Outstanding Dissertation Research Award (ODRA), and NARST Fellows Award
Noemi Waight, University at Buffalo
Katherine L. McNeill, Boston College
Dana Vedder-Weiss, Ben-Gurion University Of the Negev, Israel
Jomo Mutegi, Old Dominion University

AWARDEES TO BE NAMED

3/29/22

Research Committee
Admin Symposium-Supporting and Advancing Science Education Research Practice through Community Discussions
5:20 PM-6:50 PM, Kitsilano Ballroom D

Panelists
Stanley M. Lo, University of California San Diego
Francesca A. Williamson, Indiana University School of Medicine
Glenn R. Dolphin, Syracuse University
Joe Taylor, University of Colorado Colorado Springs
Scott Cohen, Georgia State University
Jordan L. Henley, University of Georgia
Mohammed Estaiteyeh, Western University
Theila Smith, University of Groningen
Robert M. Talbot, University of Colorado Denver

3/30/22

Strand 1: Science Learning: Development of student understanding
SC-organized paper set-Students' Conceptual Development
8:45 AM-10:15 AM, Parq Salon A
Presider: Jenny M. Dauer, University Of Nebraska–Lincoln,

Certain about uncertainty: quality of students' justifications in comparing data sets
Karel Kok, Humboldt-University
Burkhard Priemer, Humboldt-University

Constructing Science Concept Development: How Design Artifact Changes Reveal Mental Model Changes in Young Children
Christine McGrail, University of Massachusetts Amherst
Jeanne Brunner, University of Massachusetts Amherst
Martina Nieswandt, University of Massachusetts Amherst

How different approaches to science teaching influence vertical knowledge-linking within the concept of energy (Virtual)
Dennis Dietz, Freie Universität Berlin
Claus Bolte, Freie Universtaet Berlin

3/30/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions
SC-organized paper set-Equity & Social Justice in Science Teaching & Learning
8:45 AM-10:15 AM, Burrard
Presider**:** Tammy M. Long, Michigan State University,

A Case for Humane Genetics Education: How Students Used Genetics Knowledge to Argue About a Racial Disparity
Dennis M. Lee, BSCS Learning Sciences
Brian M. Donovan, BSCS
Monica Weindling, BSCS Science Learning
Awais Syed, BSCS Science Learning

Equity Considerations in Earth Science Out-of-Field Teaching and Student Performance (Virtual)
Christine P. Schlendorf
Angela M. Kelly
Robert Krakehl, Stony Brook University

Multimodal revoicing: Embodied student resources to support students' explanations of science phenomena
Samuel Lee, Boston College
Kevin Cherbow, Florida State University
Katherine L. McNeill, Boston College

Toward a community of civic practice: a case study on service-based experiential learning in support of community driven science engagement
John R. Ruppert, Saint Peter's University
Jennifer Ayala, Saint Peter's University
Yosra Badiei, Saint Peter's University
Masiel C. Infante, Saint Peter's University
Jeanette Wilmanski, Saint Peter's University

Towards an Inclusion of All in Lab Courses – The Case of a Blind Student
Stefanie Lenzer, Institute for Science Education, Leibniz University Hannover
Marvin Roski, Institute for Science Education, Leibniz University Hannover
Andreas Nehring, Institute for Science Education, Leibniz University Hannover

3/30/22

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies
Related Paper Set-Elementary Preservice Teachers Learning to Support Equitable Sensemaking
8:45 AM-10:15 AM, Parq Salon C
Discussant: Okhee Lee, New York University

Elementary Preservice Teachers Investigating Local Phenomena and Problems: Envisioning Opportunities for Equitable Student Sensemaking (Virtual)
Anna Maria Arias, Kennesaw State University
Jessica Stephenson Reaves, Kennesaw State University

An Exploration of Learning Science Subject Matter Knowledge Through Teaching in a Methods Course
Ryan Nixon, Brigham Young University
Sarah J. Fick, Washington State University

Preservice Elementary Teachers' Recognition of Resources Students Bring to Science Learning
Sarah J. Fick, Washington State University
Stephany RunningHawk Johnson, Washington State Unversity

Preservice Elementary Teachers Noticing Features of Classroom Instruction that Support Equitable Sensemaking
Amanda Benedict-Chambers, Missouri State University
Carrie-Anne Sherwood, Southern Connecticut State University
Okhee Lee, New York University

3/30/22

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
SC-organized paper set-Secondary science teachers' learning and noticing of student thinking
8:45 AM-10:15 AM, Parq Salon B
Presider: Todd L. Hutner, The University of Alabama,

An Exploratory Study of the Epistemic Goals of a First-Year Science Teacher
Todd L. Hutner, The University of Alabama

Beyond Excellence In Science Teaching Practice: Virtuosity In Science Teaching And Developing Virtuoso Teachers
Emrah Ozyurek

Teacher noticing for epistemic agency: What cues teachers to open up space for student sensemaking?
Stina Krist, University of Illinois at Urbana-Champaign
Nitasha Mathayas, Indiana University
Soo-Yean Shim, University of Illinois
Susan B. Kelly, California State University Chico
Dan Voss, Dallas Center-Grimes High School
Nessrine Machaka, University of Illinois At Urbana - Champaign
Elizabeth B. Dyer, University of Tennessee, Knoxville

What Beginning and Experienced Secondary Science Teachers Notice in Videos of Classroom Instruction
Julie A. Luft, University of Georgia
Yuxi Huang, University of Georgia
Shelby Watson, Center for Mathematics and Science Education
Harleen Singh, University of Georgia
Hatice Ozen Tasdemir, The University of Georgia
Brooke A. Whitworth, Clemson University
Yamil Ruiz, Clemson University
Hong Tran, UGA
Shaugnessy McCann, University of Georgia
Cheng-Wen He, University of Georgia

3/30/22

Strand 5: College Science Teaching and Learning (Grades 13-20)
SC-organized paper set-Student Learning in Remote Contexts: Labs and Research
8:45 AM-10:15 AM, Kitsilano Ballroom A
Presider: Wanja Gitari, University of Toronto,

A Meta-Study of Science Laboratories at a Distance
Mercy Ogunsola-Bandele, National Open University Of Nigeria
Dietmar Kennepohl, Athabasca University, Canada

Student Perspectives of Remote Participation in Authentic Research in an Undergraduate Ecology Laboratory Course
Stephen R. Burgin, University Of Arkansas
Adam M Siepielski, University of Arkansas

The Impact of Online STEM Teaching and Learning During COVID-19 on Underrepresented College Students' Self-Efficacy and Motivation (Virtual)
Sami Kahn, Princeton University
Janet Vertesi, Princeton University

The Varied Student Experience with Transitioning to Mandatory Online Chem Lab
Joseph V Watts, University of Florida
Corey A. Payne, University Of Florida
Kent J. Crippen, University of Florida
Lorelie Imperial, University of Florida
Melanie Veige, University of Florida

3/30/22

Strand 6: Science Learning in Informal Contexts
Symposium-Innovative approaches to theorizing and studying family STEM learning
8:45 AM-10:15 AM, Kitsilano Ballroom C
Discussant: Tali Tal, Technion
Presider: Neta Shaby, Ben Gurion University of the Negev,

Panelists
Neta Shaby, Ben Gurion University of the Negev
Dana Vedder-Weiss, Ben-Gurion University Of the Negev, Israel
Scott A. Pattison, TERC
Smirla Ramos-Montañez, TERC
Irit Vivante, Ben Gurion University
Lucy R. McClain, Pennsylvania State University
Adam V. Maltese, Indiana University
Amber Simpson, Indiana University
Tali Tal, Technion

3/30/22

Strand 7: Pre-service Science Teacher Education
SC-organized paper set-Tools for Assessment in Preservice teacher learning
8:45 AM-10:15 AM, Kitsilano Ballroom B
Presider: Peter Wulff, University of Potsdam,

An Evaluation Proposal for Pre-Service Primary Teachers: Self-Regulation of Learning and Emotions
Francisco José Castillo Hernández, University of Almeria
María Rut Jiménez Liso, University of Almeria
María Martínez Chico, University of Almeria
Rafael López-Gay, University of ALmeri

Are Knowledge and Acceptance of Evolution Aligned among Jewish Religious Preservice Science Teachers? (Virtual)
Merav Siani, Weizmann Institute of Science Herzog College
Anat Yarden, Weizmann Institute Of Science

Investigating Pre-service Science Teachers' Modeling Metaknowledge with Open-Ended Questions and Diagrams
Paul Engelschalt, Humboldt-Universität zu Berlin
Tom Bielik, Freie Universität Berlin
Moritz Krell, IPN - Leibniz Institute for Science and Mathematics Education, Kiel, Germany
Dirk Krüger, Freie Universität Berlin
Annette Upmeier Zu Belzen, Humboldt-Universität zu Berlin

3/30/22

Strand 8: In-service Science Teacher Education
SC-organized paper set-Teachers Working towards Inclusive Classrooms
8:45 AM-10:15 AM, Granville II
Presider: Emily J. Perry, Sheffield Hallam University,

"I wanted to break the pencil": The Teacher's Role in Reframing Moments of Epistemic Vexation
Claudia Hagan, Georgia State University
Sierra L. Morandi, Florida State University
Victor Kásper, Florida State University
Sherry A. Southerland, Florida State University

Exploring How Engineering Instruction Supports Culturally Relevant Teaching Practices
Amanda M. Gunning, Mercy College
Meghan E. Marrero, Mercy College
Kristen V. Larson, Mercy College

The Interplay Between Scientific Evidence, Diversity and Dialogic Pedagogy
Nasser Mansour, Qatar University

Using Redirections to Examine Responsiveness to Student Thinking in Secondary Science Classrooms
Lauren N. Emery, San Diego State University

3/30/22

Strand 10: Curriculum and Assessment
Symposium-AI-Based Innovative Assessments in Science
8:45 AM-10:15 AM, Parq Salon E (livestream 2)
Discussant: Joseph Krajcik, Michigan State University
Presider: Xiaoming Zhai, University of Georgia,

Panelists
Xiaoming Zhai, University of Georgia
Joseph S. Krajcik, Michigan State University
Knut Neumann, Leibniz Institute for Science Education (IPN) Kiel
Holly Amerman, University of Georgia
Changzhao Wang
Marcus Kubsch, IPN - Leibniz Institute for Science and Mathematics Education
Mei-Hung Chiu, National Taiwan Normal University
AUSTIN HEIL, University of Georgia
Gary Weiser, WestEd
Ji Shen, University Of Miami

3/30/22

Strand 11: Cultural, Social, and Gender Issues
SC-organized paper set-Resistance and Resilience of Black Women and Black Students
8:45 AM-10:15 AM, Kitsilano Ballroom D
Presider: Katherine Wade-Jaimes, University of Nevada,

"Radical Openness and Possibility": Black Women's Resistance Strategies to the Oppressive Culture of STEM
Ekaete Udoh, University of Missouri
Michele Williams, University of Missouri
Terrell R. Morton, University of Missouri - Columbia

Counterstories of Black Women About What it Means to be a STEM Person
Amal Ibourk, Florida State University
Roxanne M. Hughes, Center for Integrating Research and Learning, NHMFL / FL State University
Lauren Wagner, Florida State University

Good Trouble: Interrogating the Definition of Black Resilience in STEM Education
Takeshia Pierre, University of Florida

Creating an Experience of Belonging Within Science: Exploring Science Identity Development in a Counterspace
Ivanna Pengelley, Florida State University
Amal Ibourk, Florida State University
Roxanne M. Hughes, Center for Integrating Research and Learning, NHMFL / FL State University

3/30/22

Strand 12: Technology for Teaching, Learning, and Research
SC-organized paper set-Reinforcing and understanding effective instructional methods
8:45 AM-10:15 AM, Cambie

Advancing Teachers' Geospatial TPACK: Three Universities' Professional Development Initiatives
Kate Popejoy, Popejoy STEM, LLC
Thomas Hammond, Lehigh University
Alec M. Bodzin, Lehigh University
Judith A. Morrison, Washington State University
Molly H. Weinburgh, Texas Christian University

Electrifying STEM Experiences Through Hybrid Teacher Professional Development (Virtual)
Erik J. Schettig, North Carolina State University
Tamecia R. Jones, North Carolina State University

Applying novel methods to characterize an online, science-based affinity space
Lisa Lundgren, Utah State University
Richard T. Bex, University of Florida
Emily Slater, Utah State University
Jennifer E. Bauer, University of Michigan Museum of Paleontology
Adriane R. Lam, Binghamton University SUNY
A. McKenzie Sonderegger, Utah State University

A Systematic Literature Review on the Use of Social Network Analysis in Discourse Studies
Brock Couch, Middle Tennessee State University
Grant E. Gardner, Middle Tennessee State University

3/30/22

Strand 14: Environmental Education and Sustainability
Related Paper Set-Modelling, Assessment, and Promotion of Climate Literacy
8:45 AM-10:15 AM, Parq Salon F (livestream 3)
Presider:

Modelling and Assessing Climate Literacy – Development and Implementation of a Knowledge-in-Use Assessment Instrument (Virtual)
Hanno Michel, IPN - Leibniz Institute for Science and Mathematics Education
Ute Harms, IPN - Leibniz Institute for Science and Mathematics Education

Factors that Influence Learners' Climate Literacy and Conceptions of Climate Change (Virtual)
Nathan A. Quarderer, CIRES; Earth Lab University of Colorado Boulder

The Role of Risk Perception for Students' Climate-Friendly Intentions to Act
Carola Garrecht, IPN - Leibniz Institute for Science and Mathematics Education
Nina Christenson, Karlstad University
Ute Harms, IPN - Leibniz Institute for Science and Mathematics Education

Climate Literacy: What do teachers need to know? – A Delphi Study (Virtual)
Kathryn Leve, IPN - Leibniz Institute for Science and Mathematics Education
Ute Harms, IPN - Leibniz Institute for Science and Mathematics Education

3/30/22

Strand 15: Policy, Reform, and Program Evaluation
SC-organized paper set-Teachers and Training
8:45 AM-10:15 AM, Granville I
Presider:

Campus Association as a Predictor of Science Standard Evaluation using Multinomial Logistic Regression
Allison M. Esparza, Texas A&M University

Science Teachers Who Stay: Factors Contributing to Teacher Retention
Dorothy Holley, West Johnston High School
Soonhye Park, North Carolina State University

STEM Professionals in the Classroom and Elementary Teachers' Content Knowledge
Joanne K. Olson, Texas A&M University
Syahrul Amin, Texas A&M University
Jacob Pleasants, University of Oklahoma

The development and validation of the graduate student success survey: A quantitative study
Karen Marie Collier, North Carolina
Margaret R. Blanchard, NC State University

3/30/22

International Committee
Admin Symposium-Science Education during the COVID-19 Pandemic
8:45 AM-10:15 AM, Parq Salon D (livestream 1)

Panelists
Sonya N. Martin, Seoul National University
Mauricio Pietrocola, University of Sao Paulo, Brazil
Ernani Vassoler Rodrigues, Federal University of Espírito Santo, Brazil
Samuel M. Schnorr, Federal University of Rio de Janeiro, Brazil
Julie Nonnekens, University Medical Center Rotterdam, Netherlands
Saouma B. Boujaoude, American University Of Beirut, Lebanon
Savannah Graham, Texas Christian University, USA
Olivia Levrini, Alma Mater Studiorum, University of Bologna, Italy
Hayat Hokayam, Texas Christian University
Matthew Johnson, Pennsylvania State University, USA

3/30/22

Equity And Ethics Committee
Admin Symposium-The intersections of 'displacement' and science education: Perspectives across international contexts
8:45 AM-10:15 AM, Stanley
Discussant: Bhaskar Upadhyay, University of Minnesota

Organizers
Sara Salloum, University of Balamand
Justina A. Ogodo, Baylor University
María González-Howard, University of Texas at Austin
Bhaskar Upadhyay, University of Minnesota

Panelists
Alejandro Gallard, Georgia Southern University, USA
Maha Shuyab, Centre for Lebanese Studies at the Lebanese American University, Lebanon
Geeta Verma, University of Colorado Denver, USA
Minjung Ryu, University of Illinois-Chicago, USA

3/30/22

Strand 1: Science Learning: Development of student understanding
SC-organized paper set-Students' Reasoning
10:30 AM-12:00 PM, Parq Salon A
Presider: Jonathon Grooms, George Washington University,

6th-graders' decision-making and informal reasoning about de-extinction (Virtual)
Nannan Fan, University of North Carolina at Chapel Hill

Collaborative drawing to enable and enact reasoning-in-action.
Vanessa De Andrade, Institute of Education of University of Lisbon
Yael Shwartz, The Weizmann Institute Of Science
Sofia Freire, Institute of Education of University of Lisbon
Mónica Baptista, Instituto De Educação Da Educação Da Universidade De Lisboa

High School Students' Reasoning about the Immune System in Beirut, Lebanon
Ihsan Ghazal, Texas Christian University
Hayat Alhokayem, Texas Christian University

Using Hurricane Resilience to Foster the Development of Student Understanding of Ecosystems in Puerto Rico (Virtual)
Steven Mcgee, The Learning Partnership
Randi McGee-Tekula, The Learning Partnership
Noelia Baez Rodriguez, University of Puerto Rico

3/30/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Symposium-Teacher change of practice during Project-based science learning enactment: Case studies across diverse contexts.
10:30 AM-12:00 PM, Stanley
Discussant: Samuel Severance, University of California, Santa Cruz
Presider: Joseph S. Krajcik, Michigan State University,

Panelists
Miranda S. Fitzgerald, University of North Carolina At Charlotte
Tingting Li, CREATE for STEM Institute
Cory Susanne Miller, Michigan State University
Emily C. Adah Miller, University of Wisconsin Madison
Selin Akgun
Katy Easley, University of Michigan
Joseph S. Krajcik, Michigan State University
Samuel Severance, University of California, Santa Cruz
Susan K. Codere, MSU CREATE for STEM

3/30/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions
SC-organized paper set-Instructional & Curricular Approaches in Science Teaching & Learning
10:30 AM-12:00 PM, Cambie
Presider: Jessica Watkins, Vanderbilt University,

Pedagogical Moves That Support Coordinating Communication and Co-Authorship in a Multilingual Science Classroom
Shakhnoza Kayumova, Associate Professor of Science Education at the University of Massachusetts Dartmouth
Akira Harper, PhD Candidate at the University of Massachusetts Dartmouth
Eleanor Richard, PhD Candidate at the University of Massachusetts Dartmouth
Noemi Waight, Associate Professor of Science Education at the University at Buffalo

Impacts of a science teacher's curricular enactment and innovation on students' opportunities for scientific sensemaking
Sage Andersen, University of Texas At Austin
María González-Howard, University of Texas at Austin
Karina D Méndez Pérez, University of Texas At Austin

Instructional Strategies to Manage Scientific Uucertainties for Productive Sensemaking: Exploring Korean and American Classrooms
Heesoo Ha, Center for Educational Research, Seoul National University
Ying-Chih Chen, Arizona State University
Jongchan Park, Arizona State University

Language for scientific sensemaking: Examining a teacher's understandings and instruction for supporting their multilingual students
María González-Howard, University of Texas at Austin
Sage Andersen, University of Texas At Austin
Karina Del Carmen Mendez Perez

Pre-service Teachers' Motivations to Participate in the Near-Peer Mentoring Program (Virtual)
Ilkem Özdinç, Bogazici University
Dilara Kara, Bogazici University
Busra Karga, Bogazici University
Gaye Ceyhan, Bogazici University

3/30/22

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
SC-organized paper set-Socio-scientific issues: Assessment and conceptions in diverse contexts
10:30 AM-12:00 PM, Kitsilano Ballroom A
Presider: Matthew Johnson, Pennsylvania State University,

Formative Assessment in Socio-scientific Issues-based Science Lessons: How Teachers do this (Virtual)
Dürdane Dury Bayram-Jacobs, Eindhoven University of Technology
Ineke Henze, Radboud University
Judith Gulikers, Wageningen University & Research

Putting on a 'skeptic hat': Teachers' and students' conceptions of critiquing socioscientific data infographics
Emily Reigh, Stanford
Daniel Pimentel, Stanford University
Bryan A. Brown, Stanford University
Victor Lee, Stanford University

The Intersection of Socioscientific Issues and Classroom Diversity: Affordances and Benfits (Virtual)
Sanlyn Buxner, Planetary Science Institute and the University Of Arizona
Lauren Cabrera, Virginia Commonwealth University
Ananya Matewos, Saint Norbert College
Janelle M. Bailey, Temple University

Using Socioscientific Issues to Promote Middle School Students' Evidence-Based Reasoning and Decision-Making on Hydraulic Fracking
Wardell Anthony Powell, Framingham State University

3/30/22

Strand 5: College Science Teaching and Learning (Grades 13-20)
SC-organized paper set-Student Persistence and Well-Being
10:30 AM-12:00 PM, Parq Salon C
Presider: Jenny M. Dauer, University Of Nebraska–Lincoln,

Analysis of the Interplay between Study Satisfaction, Content Knowledge and Drop-out Intention in Chemistry Studies
Vanessa Fischer, University of Duisburg-Essen
Bianca Schindeldecker, University of Duisburg-Essen
Elke Sumfleth, University Of Duisburg-Essen
Maik Walpuski, University Of Duisburg-Essen

Effect of a Year-long Career-forward Chemistry Laboratory Curriculum on Persistence of Students Majoring in Engineering
Corey A. Payne, University Of Florida
Kent J. Crippen, University of Florida

Going beyond the Content: Impact of a Values Affirmation Writing Exercise on Student Outcomes in an Undergraduate Majors' Biology Course
Emily M. Walter, California State University - Fresno
Micah J. Johnson, California State University - Fresno
Orlando N. Lopez, California State University - Fresno
Glen Martin, California State University - Fresno

Undergraduate Biology Student Perceptions of Wellness Interventions
McKenzie N Jevnikar, NC State University
Colette E Pappas, NC State University
Lisa M Paciulli, NC State University

3/30/22

Strand 5: College Science Teaching and Learning (Grades 13-20)
SC-organized paper set-Students' Learning Science and Engineering Practices
10:30 AM-12:00 PM, Parq Salon B
Presider: Angela Google, Middle Tennessee State University,

A Model for Facilitating Multidisciplinary Justifications in Engineering Design Challenges (Virtual)
Carina M. Rebello, Purdue University

An investigation of argumentation task framing on students' use of data in introductory biology
Erika Offerdahl, Washington State University
Jessie Arneson, Washington State University
Brett Baerlocher, Idaho State University
Guraustin Brar, Washington State University
Nyck Ledezma, San Louis Obispo
Esperanza Artiles, Central Washington University
Andy Cavagnetto, Washington State University

Drawing-to-Learn in an Undergraduate Herpetology Course: Drawing as a scientific practice to develop Professional Vision
Ashelee Rasmussen, Idaho State University
Charles R. Peterson, Idaho State University
Anna S. Grinath, Idaho State University

When Multimodality Meets Modeling: A Case Study of Preservice Elementary Teachers Building Knowledge in Science (Virtual)
Ayca K. Fackler, University of Georgia

3/30/22

Strand 7: Pre-service Science Teacher Education
SC-organized paper set-On becoming a science teacher
10:30 AM-12:00 PM, Kitsilano Ballroom B
Presider: Claudia Hagan, Georgia State University,

"Seriously... I Want to Teach": Exploring Motivations of Science Majors Pursuing Teaching Careers
Austin Heil, University of Georgia
Julie A. Luft, University of Georgia

An Expanded Understanding of the Influence of Antecedent Socialization on the Choice to Become a Science Teacher
Emma J. Refvem, North Carolina State University
M. Gail Jones, North Carolina State University
Sarah J. Carrier, North Carolina State University
Kathryn Rende, North Carolina State University
Julianna Nieuwsma, NC State University
Tammy D. Lee, East Carolina University
Amy R. Taylor, University Of North Carolina At Wilmington

Development of Teacher Identity: From
Saiqa Azam, Memorial University Of Newfoundland
Karen Goodnough, Memorial University Of Newfoundland

3/30/22

Strand 8: In-service Science Teacher Education
SC-organized paper set-Large Scale Investigations Measures of Teacher Learning
10:30 AM-12:00 PM, Parq Salon E (livestream 2)
Presider:

Changes in Teachers' Beliefs and Confidence across Multiple Rounds of Professional Development
Benjamin R. Lowell, Boston College
Katherine L. McNeill, Boston College

Developing Science Teachers Professional Competence in Opened Experimentation – An Intervention Study
Markus Emden, Zurich University of Teacher Education
Arne Bewersdorff, Technical University of Munich
Armin Baur, Heidelberg University of Education

Response Shifts in Measurement of Teacher Growth (Virtual)
Andrea Ash, University of Iowa
Gavin W. Fulmer, University Of Iowa

Strengthening Teachers' Confidence to Mentor Students in STEM Research and Science & Engineering Fair Competitions: PD Models for In-person and Virtual Formats (Virtual)
Julie Angle, Oklahoma State University
Rachel Hartnett, Mount St. Mary's University Emmitsburg, MD

3/30/22

Strand 11: Cultural, Social, and Gender Issues
SC-organized paper set-Structural and Cultural Approaches to Identity and Its Influence
10:30 AM-12:00 PM, Parq Salon D (livestream 1)

A Cultural Impostor? Native American Experiences of the Impostor Phenomenon in STEM (Virtual)
Devasmita Chakraverty, Indian Institute of Management Ahmedabad

Cultural and Racial Barriers for International Students of Color in STEM Graduate Programs
Miguel Rodriguez, University of Utah
Ramon Barthelemy, University of Utah

Understanding the Role of Race and Identity Development in Ethnically Diverse Students at an HBCU
Karen Benn Marshall, Oakwood University
Carmen Bucknor, Oakwood University
Sylvia M. James, National Science Foundation
Christyn Byrd, Oakwood University

Would a career in science suit me? Students' self-view in relation to science and STEM career aspirations (Virtual)
Irene Drymiotou, University of Cyprus & University of Groningen
Costas P. Constantinou, University of Cyprus
Lucy Avraamidou, University Of Groningen

3/30/22

Strand 11: Cultural, Social, and Gender Issues
Related Paper Set-Multi-faceted and Emerging Approaches towards Transforming STEM Teaching, Learning and Research
10:30 AM-12:00 PM, Granville I

Pedagogical/research methodological approaches for analyzing power shifts in science classrooms
Kathleen Schenkel, San Diego State University

Productive tensions: Researching and imagining a more just STEM education with youth researchers
Colin Hennessy Elliott, Utah State University

Challenging dominant science and language ideologies and practices as a 7th grade dual language teacher
Melissa A. Navarro, San Diego State University
Terrance Burgess, Michigan State University

"Simon says learn." Investigating the narrated and practiced science identities of elementary students of color

Uniting technical approaches and diverse communities: Bringing social justice at the forefront of engineering's design considerations (Virtual)
Sebastian Schäfer, Technical University of Munich
Greses Pérez, Tufts University
Swetha Nittala, Stanford University
Sherri D Sheppard, Stanford University

3/30/22

Strand 12: Technology for Teaching, Learning, and Research
SC-organized paper set-Using Computational Thinking and Videos to Support Pre-Service and In-Service Teachers
10:30 AM-12:00 PM, Kitsilano Ballroom C
Presider: Esther Oluwafunmilayo Peter,

Computational Thinking (CT) Integrated STEM Approach: Early Childhood Pre-Service Teachers' CT Skills
Ayse Ciftci, Mus Alparslan University
Mustafa S. Topcu, Yildiz Technical University

Learning Effective Explanation Videos in Physics Lessons
Fabian Gabriel Sterzing, Paderborn University
Christoph Kulgemeyer, Paderborn University
Peter Reinhold, Paderborn University

Leveraging Learning Experience Design to Deploy Embedded Video Questions to Support Students' Online Learning Experience
Joseph T. Wong, University of California, Irvine
Natalie Au Yeung, University of California, Irvine
Brad Hughes, University Of California, Irvine

The Power of Context: Factors that Influence Teachers' Implementation of Unplugged CT-Infused Science Lessons (Virtual)
Vance J. Kite, North Carolina State University
Soonhye Park, North Carolina State University

3/30/22

Strand 14: Environmental Education and Sustainability
Related Paper Set-Towards a Sociopolitical Dispositif Prioritizing Ecological Vitality and Social Justice
10:30 AM-12:00 PM, Kitsilano Ballroom D

Among the Possible, the Is and the Ought: Constructs of 'Micro-Sociotechnical Imaginaries' (Virtual)
Majd Zouda, OISE, University of Toronto
Dimitris Tsoubaris , National and Kapodistrian University of Athens
Sarah El Halwany, University of Calgary, Calgary, AB, Canada
Mohammad Nurul-Hassan, OISE, University of Toronto
Minja Milanovic, The Bishop Strachan School, Toronto, ON
Sadia Sahibzada , OISE, University of Toronto
John Lawrence Bencze, University of Toronto

Students' Material-Semiotic Alliances After Power-focused Application-based Learning
John Lawrence Bencze, OISE, University of Toronto
Dave Del Gobbo, Peel District School Board
Sarah El Halwany, University of Calgary, Calgary, AB, Canada
Mohammad Nurul-Hassan, OISE, University of Toronto
Minja Milanovic, The Bishop Strachan School, Toronto, ON
Jasmine Yeung, OISE, University of Toronto
Majd Zouda, University of Toronto

Weaving Art & Science Pedagogies for More Ecologically-vital & Socially-just Dispositifs
Dave Del Gobbo, Peel District School Board, Mississauga, ON, Canada
Sheliza Ibrahim Khan, University of Toronto
Sarah El Halwany, University of Calgary, Calgary, AB, Canada
Majd Zouda, University of Toronto
Minja Milanovic, The Bishop Strachan School, Toronto, ON
Mohammad Nurul-Hassan, OISE, University of Toronto
Mirjan Krstovic, Peel District School Board, Mississauga, ON, Canada
John Lawrence Bencze, OISE, University of Toronto

Teaching with Emotions: Supporting Critical Views on Nature of Science
Sarah El Halwany, University of Calgary, Calgary, AB, Canada
Mohammad Nurul-Hassan, OISE, University of Toronto
Dave Del Gobbo, Peel District School Board, Mississauga, ON, Canada
Sheliza Ibrahim Khan, University of Toronto
Jasmine Yeung, OISE, University of Toronto
Majd Zouda, OISE, University of Toronto
John Lawrence Bencze, OISE, University of Toronto

Applying an Action-Oriented Pedagogy and STEM Teacher Identity: An Autoethnography

Mohammad Nurul-Hassan, OISE, University of Toronto
Sarah El Halwany, University of Calgary, Calgary, AB, Canada
Majd Zouda, University of Toronto
Kristen Schaffer, OISE, University of Toronto
John Lawrence Bencze, University of Toronto

3/30/22

Research Committee
Admin Symposium-Future Directions for Research on Equitable and Socially Just Assessments in Science and Engineering Education *(Virtual)*
10:30 AM-12:00 PM, Burrard

Panelists

How Could Lack of Alignment Create Inequitable Assessment Systems? (Virtual)
Gavin Fulmer, National Science Foundation, University of Iowa

I am the White assessor: Grappling with dominant paradigms in Framework-aligned formative assessment (Virtual)
Erin Furtak, University of Colorado at Boulder

Developing Justice-Focused Assessment Tasks: Tensions and Possibilities (Virtual)
William Penuel, University of Colorado at Boulder

Addressing equity from the margins: Outcomes of teacher professional development practice (Virtual)
Sheron Mark, University of Louisville

Engineering Curriculum Design for Equitable Assessments (Virtual)
Christine Cunningham, Pennsylvania State University

Translanguaging as a Linguistically Sustaining Science Formative Assessment Design Framework (Virtual)
Caitlin Fine, Boston College

How do we know? The Implications of Translanguaging for Equitably Assessing Multilingual Students' Science Learning (Virtual)
Enrique Suarez, University of Massachusetts at Amherst

3/30/22

Multi-Strand-*Virtual Session C*
10:30 AM-12:00 PM, Parq Salon F (livestream 3)

Epistemic Empathy: A Resource for Responsive Teaching (Virtual)
Lama Z. Jaber, Florida State University
Shannon G. Davidson, Florida State University
Allison Metcalf, Florida State University

From Practical to Metacognitive Strategy: Meta-epistemic Discourse and Crosscutting Concept Supports in Curriculum
Lori Andersen, University of Hawai‘i at Mānoa

Evaluating the Impact of Online Activities Designed to Help High School Students Reason like Chemists (Virtual)
Sierra McCormick, WestEd
Jodi Davenport, WestEd
Anna Rafferty, Carleton College
Jacklyn Powers, WestEd
Sandra Raysor, Carnegie Mellon University
David Yaron, Carnegie Mellon University

Modeling-based Learning in Pre-School Science: Affordances of Different Types of Student-Constructed Models (Virtual)
Loucas T. Louca, European University-Cyprus

3/30/22

Strand 1: Science Learning: Development of student understanding
SC-organized paper set-Modelling in Science Learning
1:30 PM-3:00 PM, Parq Salon D (livestream 1)
Presider: Marcus Kubsch, IPN - Leibniz Institute for Science and Mathematics Education,

Building a Computational Model of Food Webs: Impacts on Computational and Systems Thinking Skills
Arif Rachmatullah, SRI International
Eric N. Wiebe, North Carolina State University

Mathematical Modelling in Physics Education
Lilach Ayali, Technion - Israel Institute of Technology
Shulamit Kapon, Technion - Israel Institute of Technology

Scaffolding Sociopolitical Dimensions of Climate Change in Diagrammatic Models (Virtual)
Heather F. Clark, UCLA
Darlene Tieu, LAUSD
Leticia Perez, UCLA
Jaleel Howard, UCLA

Students' Conceptual Models in the Context of Air-Quality Learning Unit
Shirly Avargil, Technion - Israel Institute of Technology
Arunika Saxena, Technion Israel Institute of Technology
François G. Amar, University of Maine
Mitchell Bruce, University Of Maine

3/30/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions
SC-organized paper set-High school Science Teaching & Learning
1:30 PM-3:00 PM, Cambie
Presider:

Exploring the Efficacy of CTCA in Breaking Barriers to Students' Learning of Difficult Concepts in Biology
Imole J. Samson, Lagos State University
Peter A. Okebukola, ACEITSE-Lagos State University
Esther O. Peter, ACEITSE-Lagos State University
David G. Peter, Lagos State University
Deborah Oluwatosin Agbanimu, ACEITSE-Lagos State University
Fred Awaah, University of Professional Studies Accra
Franklin U. Onowugbeda
Adekunle I. Oladejo, ACEITSE-Lagos State University

Investigating students' context choice in chemistry education
Fabien Güth, University of Duisburg-Essen
Helena Van Vorst, University of Duisburg-Essen

Students' Types of Interest in Physics
Sarah Maria Zoechling
Julia Woithe, CERN
Sascha M. Schmeling, CERN
Martin Hopf, University of Vienna

Studying girls' achievement outperformance in Oman: An exploration of attitudinal perceptions towards Science and learning
Sulaiman M. Al-Balushi, Sultan Qaboos University
Rashid S Almehrizi, Sultan Qaboos University
Ibrahim S. Al-Harthy, Sultan Qaboos University
Ambusaidi K. Abdullah, Sultan Qaboos University
Khadijah Al-Balushi, Ministry of Education
Moza Al-Balushi, Ministry of Edcation
Mohammed Al-Aghbari, Sultan Qaboos University

Using Science Historical Short Stories to Impact Students' Science-specific and General Epistemological Beliefs (Virtual)
Jaclyn M. Easter, Grand View University
Jerrid W. Kruse, Drake University
Jesse L. Wilcox, University of Northern Iowa

3/30/22

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies
Related Paper Set-Project-based Learning Contexts for Developing Adaptation Design Principles that Promote Engagement and Equity
1:30 PM-3:00 PM, Parq Salon C
Discussant: Samuel Severance, University of California, Santa Cruz
Presider: Joseph S. Krajcik, Michigan State University,

Using Adaptation Design Principles to Support Teacher Agency in Professional Learning
Emily C. Adah Miller, University of Wisconsin Madison
Susan K. Codere, MSU

PBL Adaptation Principles to Support Equitable Science Instruction
Selin Akgun, Create4STEM
Maria Simani, University of California at Riverside
Hilda Makori, Create for STEM at Michigan State University

Employing adaptation design principles to enhance elementary student engagement in modeling (Virtual)
Tingting Li, CREATE for STEM Institute

How can culturally responsive teaching be framed as creative endeavor through adaptation design principles? (Virtual)
Maria C. Simani, University Of California, Riverside
Kathryn Bateman, Create for STEM at Michigan State University
Emily C Miller, University of Wisconsin-Madison

3/30/22

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
SC-organized paper set-STEM integration in secondary science classrooms
1:30 PM-3:00 PM, Granville II
Presider: Brandon Rodriguez, NASA Jet Propulsion Lab,

How do excellent STEM teachers design and implement best practice of inquiry-based learning? (Virtual)
Shani Zur, Technion Institue
Tali Tal, Technion

Middle School Teachers and Undergraduate Mentors Collaborating for Culturally Relevant STEM Education
Meredith W. Kier, College of William and Mary

The impact of technical Science in increasing access to Stem education for vocational careers in South Africa
Emmanuel Mushayikwa, University of the Witwatersrand
Magdeline Mmapaseka Stephen, University of Witwatersrand

Using event mapping to investigate secondary master teachers' enactment of Naval STEM tasks
Jeffrey D. Radloff, SUNY Cortland
Dominick Fantacone, SUNY Cortland
Angela Pagano, SUNY Administration

3/30/22

Strand 5: College Science Teaching and Learning (Grades 13-20)
SC-organized paper set-Student Success and 21st Century Skills
1:30 PM-3:00 PM, Parq Salon B
Presider: James M. Nyachwaya, North Dakota State University,

Addressing Pre-service Teachers' Misconceptions and Promoting Conceptual Understanding through the Conceptual Change Model.
Johannes Addido, University of Wyoming

Evaluating Evidence-Based Practices Influencing Graduation and Participation in the STEM Workforce and Graduate Programs
Natalie L Hyslop, University of North Georgia
John Holliday, University of North Georgia
Linda B Purvis, University of North Georgia
April A Nelms, University of North Georgia
John D Leyba, University of North Georgia
Michael Bodri, University of North Georgia

Improving Self-Reported Measures of 21st Century Skills in an Interdisciplinary Undergraduate STEM Course
Haider Ali Bhatti, Graduate Group in Science and Mathematics Education (SESAME) University of California, Berkeley
Perman Gochyyev, Graduate School of Education University of California, Berkeley
Mark Wilson, Graduate School of Education University of California, Berkeley
Robert J Full, Department of Integrative Biology University of California, Berkeley

Investigating Student Response to Anomalous Data When Analyzing and Interpreting Data
Adrian L Adams, University of Utah, Department of Educational Psychology
Lauren A Barth-Cohen, University Of Utah, Department of Educational Psychology
Jason M May, University of Utah, Department of Physics and Astronomy

3/30/22

Strand 5: College Science Teaching and Learning (Grades 13-20)
SC-organized paper set-Undergraduate and Graduate Student Perspectives on Teaching and Learning
1:30 PM-3:00 PM, Kitsilano Ballroom A
Presider:

Analysis of graduate teaching assistant discourse behaviors and the effects of a professional development intervention
Abdirizak M. Warfa, University of Minnesota
Marin Melloy, University of Minnesota

Biology Teaching Assistants Engagement with Educative Curriculum Materials and Enactment of Rigorous Classroom Discourse
Alyssa Freeman, Idaho State University
Angela Google, Middle Tennessee State University
Zhigang Jia, Middle Tennessee State University
Tina B Carter, Middle Tennessee State University
Anna S. Grinath, Idaho State University

How Physical Science Doctoral Students Involved in Educational Outreach View and Value their Educator Role
Anne M McAlister, University of Virginia
Sarah Lilly, University of Virginia
Jennifer Chiu, University Of Virginia

Relating TAs' Enacted Instruction to their Beliefs about Teaching and Learning in an Introductory Physics Tutorial using CHAT (Virtual)
May Lee, University of Groningen
Michael Bennett, University of Colorado - Boulder

3/30/22

Strand 7: Pre-service Science Teacher Education
SC-organized paper set-Building preservice teacher self-efficacy and competence in STEM Education
1:30 PM-3:00 PM, Granville I
Presider: Hadeel Omar Edrees Dabbah, Ben-Gurion University of the Negev,

An Investigation of Pre-Service Teachers' Self-Efficacy Perceptions for STEM Integration (Virtual)
Hamdican Yildirim, Hacettepe University
Sevinc Gelmez Burakgazi, Hacettepe University

Integrating Computational Thinking (CT) in STEM Education: Early Childhood Pre-Service Teachers' CT Teaching Self-Efficacy Beliefs
Mustafa S. Topcu, Yildiz Technical University
Ayse Ciftci, Mus Alparslan University

Pre-service Teachers' Learning to Infuse Engineering Indicators into STEM Lesson Plans (Virtual)
Sevgi Aydin, Van Yuzuncu Yil University
Betul Ekiz Kiran, Tokat Gaziosmanpasa University
Elif Selcan Oztay, Van Yuzuncu Yil University

3/30/22

Strand 7: Pre-service Science Teacher Education
SC-organized paper set-Using technology and modeling in science teacher education
1:30 PM-3:00 PM, Parq Salon F (livestream 3)
Presider: Xinying Yin, California State University-San Bernardino,

Fostering TPACK in Science Teacher Education – Re-Design and Evaluation of a University Course (Virtual)
Lisa Stinken-Rösner, Leuphana University Lüneburg

Knowledge, Practice and Product: Developing Preservice Science Teachers' Modelling Competence
Song Xue, School of Education and Social Work, University of Dundee
Keith Topping, School of Education and Social Work, University of Dundee
Elizabeth Lakin, School of Education and Social Work, University of Dundee

Science Teaching Orientations of Pre-Service Teachers in a Transformative Learning Environment
Duygu Yilmaz Ergul , Gazi University
Mehmet F. Tasar, Gazi University

That's Enough For An Explanation: Pre-Service Teachers Linking Epistemic And Pedagogical Decisions When Developing Models (Virtual)
Maria E. Tellez-Acosta, PhD Student Martin-Luther-Universität Halle-Wittenberg
Scott McDonald, Professor of Science Education. Pennsylvania State University
Andres Acher, Primary Science Education. Fakultät für Biologie, Universität Bielefeld

3/30/22

Strand 8: In-service Science Teacher Education
Symposium-Supporting Teacher Leadership Development: Roles, Growth and Research
1:30 PM-3:00 PM, Kitsilano Ballroom C
Presider: Arthur Eisenkraft, University Of Massachusetts Boston,

Panelists
Emily J. Perry, Sheffield Hallam University
Arthur Eisenkraft, University Of Massachusetts Boston
Amanda M. Gunning, Mercy College
Meghan E. Marrero, Mercy College
Tammy Wu Moriarty, Stanford University, Graduate School of Education
Janet Carlson, Stanford University
Stuart C. Bevins, Sheffield Hallam University
Richard Pountney, Sheffield Hallam University
Josephine Booth, Sheffield Hallam University
Joelle Halliday, Sheffield Hallam University

3/30/22

Strand 11: Cultural, Social, and Gender Issues
SC-organized paper set-Student Engagement Across Intersecting Identities
1:30 PM-3:00 PM, Kitsilano Ballroom D
Presider:

Ways of Identifying as Other: a longitudinal case study of women of colour in physics (Virtual)
Nicola Wilkin, University of Birmingham
Jaimie Lauren Miller-Friedmann, University of Birmingham
Judith Hillier, University of Oxford

Intersectional Analysis of Advanced Placement Chemistry Enrollment and Performance (Virtual)
Robert Krakehl, Stony Brook University
Martin Francis Palermo, Stony Brook University
Angela M. Kelly, Stony Brook University

Enhancing Performance of Students with Intersectional Identities in Inclusive Science Classrooms via Multimedia Professional Development
Lindsay M. Carlisle, University of Virginia
Victoria VanUitert, University of Virginia
Michael J. Kennedy, University of Virginia

Examining Exclusionary and Inclusionary College Classroom Experiences: Effects on Women in Engineering Majors by Race/Ethnicity
Tatiane Russo-Tait, University of Texas at Austin
Catherine Riegle-Crumb, University of Texas at Austin
Ursula Nguyen, University of Texas at Austin
Katherine Doerr, The University of Texas at Austin

3/30/22

Strand 11: Cultural, Social, and Gender Issues
SC-organized paper set-Approaches to Equitable Science Teaching in K-12 Classrooms
1:30 PM-3:00 PM, Stanley
Presider: Kathleen Schenkel, University of Michigan,

Connecting Justice-Centered pedagogy to Students' Critical Science Agency in an Elementary and Middle School Science Classroom
Selene Y. Willis, University Of South Florida
Dana L. Zeidler, University Of South Florida

Enhancing STEM Teacher Candidates' Understanding and Implementation of Equity, Diversity, and Inclusion Through Differentiated Instruction
Mohammed Estaiteyeh, Western University
Isha DeCoito, Western University

The Importance of Epistemic Empathy for Equitable and Rigorous Science Teaching
Allison T Metcalf, Florida State University
Shannon G. Davidson, Florida State University
Lama Jaber, Florida State University

Challenges Encountered by Multilingual Learners while Reading to Learn Science: The Role of Intertextuality
Sauoma B. Boujaoude, American University Of Beirut
Sara Salloum, University of Balamand

3/30/22

Strand 12: Technology for Teaching, Learning, and Research
SC-organized paper set-Using digital technologies, simulated teaching, and assessment to support teaching and learning
1:30 PM-3:00 PM, Burrard
Presider:

TPACK in teacher education - Supporting pre-service teachers´ reflections and use of digital technologies in science teaching (Virtual)
Pernilla Nilsson, Halmstad University

Using Simulated Classrooms to Examine How Formative Feedback Impacts Elementary Teachers' Ability to Facilitate Discussions
Jamie N. Mikeska, Educational Testing Service (ETS)
Jonathan Steinberg, ETS
Pamela S. Lottero-Perdue, Towson University
Dante Cisterna, Educational Testing Service

Analysis of Concept Maps for the use in Formative Assessment: Can Machine Learning help?
Tom Bleckmann, Leibniz Universitaet Hannover, Institute for Mathematics and Physics Education
Gunnar Friege, Leibniz Universitaet Hannover, Institute for Mathematics and Physics Education
Wolfgang Gritz, TIB Hannover
Ralph Ewerth, TIB Hannover

Digital Curation as a Pedagogical Approach Promoting Critical Thinking (Virtual)
Rivka Gadot, Technion - Israel Institute Of Technology Jerusalem College of Technology The Open University of Israel
Dina Tsybulsky, Technion - Israel Institute Of Technology

3/30/22

Strand 14: Environmental Education and Sustainability
SC-organized paper set-Building competencies for tackling real world problems
1:30 PM-3:00 PM, Parq Salon A
Presider: Imogen R Herrick, University of Southern California,

Infusing social responsibility in higher education through education for sustainable development (Virtual)
Heba El-Deghaidy, The American University In Cairo

Theorizing Science-Civic Practices: Youth Adaptation and Remixing of Science Practices within Digital Civic Participation
Lynne Zummo, University of Utah
Emma C Gargroetzi, University of Texas at Austin

The Effectiveness of Education for Sustainable Development in Promoting Students' Action Competence for Sustainability
Daniel Olsson, Environmental and Life Sciences, Karlstad university
Niklas M. Gericke, Department of Environmental and Life Sciences

A Curricular Model to Train Doctoral Students in Interdisciplinary Collaborative Research at the Food-Energy-Water Nexus (Virtual)
Rianna T. Murray, University of Maryland, College Park
Kelsey McKee, University of Maryland, College Park
Amy R Sapkota, University of Maryland, College Park
Stephanie Lansing, University of Maryland, College Park
Gili Marbach-Ad, University Of Maryland, College Park

3/30/22

Admin Symposium-Indigenous science knowledge as social and cultural capital supporting more resilient and sustainable communities
1:30 PM-3:00 PM, Parq Salon E (livestream 2)

Panelists
Pauline W. U. Chinn, University of Hawaii at Manoa
Bhaskar Upadhyay, University of Minnesota
David Zandvliet, Simon Fraser
Gayle A. Buck, Indiana University
Julie R. Robinson, University of North Dakota
Rouhollah Aghasaleh, Humboldt State University
Kamal P. Koirala, Tribhuvan University