98th NARST International Conference | Digital Program

March 23 - 26, 2025

In Praise of Science Teachers:

Essential Partners in Researching, Reframing, and Reforming Science Learning

Washington, DC

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98th NARST International Conference

Please note that this program is subject to change.

Check the addendum posted at the meeting and **here** for updates.

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98th NARST International Conference

General Information

Information about NARST

NARST is a global organization for improving science teaching and learning through research. Since its inception in 1928, NARST has promoted research in science education and the communication of knowledge generated by the research. The ultimate goal of NARST is to help all learners achieve science literacy.

The Association is incorporated as a non-profit corporation in the State of Minnesota. The official publication is the *Journal of Research in Science Teaching (JRST)*. NARST encourages presentations of a wide variety of investigations in all aspects of science education, including action, historical, philosophical, ethnographic, experimental, and evaluative research studies. Reports of empirical research, critical reviews, and theoretical works are encouraged. In October 2010, to reflect the Association's growing international focus and membership, the Board approved referring to the Association by its acronym only. At the April 2011 Board Meeting, the tagline for the Association was approved by the Board. Thus, the Association's name and tagline is:

> ***NARST— A global organization for improving science education through research.***

Research areas of interest to NARST members include curriculum development and organization, assessment and evaluation, learning theory, teacher education, programs for exceptional students (special needs and talents), equity studies, policy, and methods of teaching.

NARST Mission Statement

NARST is a global organization of professionals committed to the improvement of science teaching and learning through research. Since its inception in 1928, NARST has promoted research in science education and the communication of knowledge generated by the research.

The ultimate goal of NARST is to help all learners achieve science literacy. NARST promotes this goal by: **1)** encouraging and supporting the application of diverse research methods and theoretical perspectives from multiple disciplines to the investigation of teaching and learning in science; **2)** communicating science education research findings to researchers, practitioners, and policy makers; and **3)** cooperating with other educational and scientific societies to influence educational policies.

Member Benefits

- Ten issues per year of the Journal of Research in Science Teaching (electronic version), with access to **JRST online** through Wiley InterScience.
- Access to the **NARST Member Forum**. Stay connected and informed of NARST activities, position openings, committee and Research Interest Group events, graduate student events, and more.
- Discounted registration rate for the NARST Annual International Conference.
- Opportunities to apply for **scholarships and travel support**.
- Access to **NARST Virtual Events** throughout the year. We encourage members to propose webinars, workshops, and other virtual events that align with NARST's mission. Committees, RIGs, strands, and NARST leadership offer events for members free of charge.
- Opportunities to volunteer for **committees** and **leadership positions**.
- Opportunities to serve as a mentor for new members and early career scholars: **Sandra K. Abell Institute**, **Mentor/Mentee Nexus**, and more.

NARST
A global organization for improving science education through research

NARST Programs and Events Code of Conduct Policy

NARST is committed to providing a safe, productive, and welcoming environment for all meeting participants and NARST staff. All participants, including, but not limited to, attendees, speakers, volunteers, exhibitors, sponsors, staff members, and all others are expected to abide by this Programs Code of Conduct. This Policy applies to all NARST meeting-related events, including those sponsored by organizations other than NARST but held in conjunction with NARST events, on public or private platforms.

Unacceptable Behavior is defined as:

- Harassment, intimidation, or discrimination in any form.
- Verbal abuse of any attendee, speaker, volunteer, exhibitor, sponsor, NARST staff member, other meeting guest or venue staff member.
- Examples of verbal abuse include, but are not limited to, verbal comments related to gender, sexual orientation, disability, physical appearance, body size, race, religion, national origin, inappropriate use of nudity and/or sexual images in public spaces or in presentations, or threatening or stalking any attendee, speaker, volunteer, exhibitor, NARST staff member, service provider, other meeting guest, or venue staff member.
- Disruption of presentations during sessions, in the exhibit hall, or at other events organized by NARST throughout the meeting.
- Participants should not copy or take screen shots of Q&A or any chat room activity that takes place in the virtual space.

NARST reserves the right to take any action deemed necessary and appropriate, including immediate removal from the meeting without warning or refund, in response to any incident of unacceptable behavior, and NARST reserves the right to prohibit attendance at any future meeting, virtually or in person.

If you experience harassment or hear of any incidents of unacceptable behavior, NARST asks that you inform either NARST Executive Director, Mackenzie Kelley, **ExecutiveDirector@narst.org** or NARST Events Manager, Amy Sellheim **Amy.Sellheim@management-hq.com** so that we can take the appropriate action.

Code of Ethical Conduct

The purpose of the National Association of Research in Science Teaching (NARST) Code of Ethical Conduct is to articulate a set of aspirational principles to guide and support members as they engage in professional activities—research, teaching, and service. NARST members are science education professionals who include researchers, practitioners, and graduate students from various cultures worldwide. These aspirational principles align with and support the mission of the organization to help all members achieve, develop, and contribute meaningfully to the improvement of science teaching and learning through research. NARST expects its members to adhere to the highest ethical standards. The Code of Ethical Conduct serves as a guide to the everyday professional conduct of science educators.

Unfamiliarity with NARST's Code of Ethical Conduct is not a valid defense for engaging in or failing to challenge observed unethical behavior. We accomplish this through our Code of Ethical Conduct where there is:

A. Professional Competence

Science education professionals strive to maintain the highest levels of competence in their work; they recognize the limitations of their expertise; and they undertake only those tasks for which they are qualified by education, training, or experience. They recognize the need for ongoing education in order to remain professionally competent; and they utilize the appropriate scientific, scholarly, professional, technical, and administrative resources needed to ensure honesty and integrity. Science education professionals conduct research, teach, practice, and provide service only within the boundaries of their competence, based on their education, training, supervised experience, or appropriate professional experience. They consult with other professionals when necessary for the benefit of their students, research participants, and clients. They maintain awareness of current scientific, scholarly, and professional information in their fields of activity and undertake continuing efforts to maintain competence in the skills they use. Importantly, professional competence must also include a willingness to accept and integrate new information and experiences, regardless of the effect that process has on research outcomes.

B. Integrity

It is the social responsibility of science education professionals to maintain integrity in all conduct, publications, and forums, and give due credit to the contributions of others. Adhering to this standard means science education professionals do not fabricate, falsify, or plagiarize. Public comments on matters of importance that are relevant to science education must be made with care and accuracy. Adhering to this standard means science education professionals do not use deficit language, deceptive statements concerning research data, or otherwise knowingly make false, misleading or deceptive statements in practicing and presenting research. Comment and debate within the bounds of collegiality and professionalism that keep the organization moving forward and current with emergent issues and perspectives are encouraged. Adhering to this standard means science education professionals do not use dismissive remarks or gestures, restrict multiple voices, or use derogatory language. In short, science education professionals conduct their professional activities in ways that engender trust and confidence.

C. Professional and Scholarly Responsibility in Science Teaching, Learning, and Research

Science education professionals have a responsibility to use research practice and policy to advance NARST members' understanding of the teaching and learning of science in all learning contexts—formal, informal, local, and global—through research, practice, and policy. They adhere to the highest scholarly and professional standards within their field of expertise and accept responsibility for adherence to those standards. Science education professionals should regard the tutelage of graduate students and early career faculty as a trust conferred by the organization for which they work, as well as NARST, for the promotion of these individuals' learning and professional development.

Science education professionals understand that they form a community and show respect for other science education professionals even when they disagree on theoretical, methodological, or personal approaches to professional activities. In activities involving marginalized populations, it is essential that responsible science education professionals seek out the voices and experiences of members of these groups and treat them as critical to their scholarship. While always endeavoring to be collegial, science education professionals must never let the desire to be collegial outweigh their shared responsibility for ethical behavior. When appropriate, they consult with colleagues, NARST's Equity and Ethics Committee, or organizational entities such as their institutional review board in order to prevent, avoid, or challenge unethical conduct.

D. Respect for People's Rights, Dignity, and Diversity

Science education professionals respect the rights, dignity, and worth of all people in their professional activities. They treat other professionals, students, research participants, and members of the organization fairly, respectfully, and without exploitation or harassment. Science education professionals acknowledge the rights of others to hold values, attitudes, and opinions that differ from their own and take reasonable steps to avoid harm to others in the conduct of their work. They learn with others, share ideas honestly, give credit for others' contributions, and encourage others to contribute their unique skills, knowledge, and interests in professional environments. Science education professionals are sensitive to cultural, individual, and role differences in teaching, studying, and providing service to groups of people with distinctive characteristics, as well as the power differential that might result from such differences.

Science education professionals carefully avoid discrimination and bias toward individuals and groups based on race, gender, age, religion, ethnicity, nationality, sexual orientation, gender expression, gender identity, presence of disabilities, educational background, socioeconomic status, or other personal attributes. They refrain from making biased assumptions about others and perpetuating demeaning attitudes and stereotypes. Science education professionals do not accept any forms of discrimination and actively challenge implicit and explicit forms of discrimination.

E. Social Responsibility

Science education professionals are aware of their scientific and professional responsibility to the communities and societies in which they live. This awareness extends to their involvement and service to an increasingly diverse and international NARST community. NARST members are guided by the values and standards that reflect the professional literature. They strive to promote equity and the public good by advancing scientific and scholarly knowledge. Science education professionals are aware of the differences in society and culture that impact scholarly knowledge and academic work. They value and embrace the public trust in research and teaching and are concerned about their ethical behavior and the behavior of other science education professionals that might compromise that trust. Science education professionals should reasonably expect of themselves and others to be guided by a code of ethics that supports efforts to resolve ethical dilemmas.

References

AERA Council. (2011). Code of ethics: American Educational Research Association. Educational Researcher, 40(3), 145-146.

American Sociological Association. (1999). Code of ethics and policies and procedures of the ASA committee on professional ethics. Retrieved from: **http://www.asanet.org/membership/code-ethics**

American Psychological Association. (2017). Ethical principles of psychologists and code of conduct. Retrieved from: **https://www.apa.org/ethics/code/**

Research Interest Groups (RIGs) Information

Continental and Diasporic Africa in Science Education RIG (CADASE)

The purpose of CADASE RIG is to **(a)** encourage science educators to engage in research aimed at meeting the needs of people of African descent; and **(b)** provide intellectual, professional, and personal space for science educators engaged in such research. This RIG will provide opportunities for science education researchers to integrate the study of culture, ethnicity, gender, race, and social class as lenses for performing critical analyses and evaluations of prevailing theory and practice of science education on the lives of people of African descent. A variety of theoretical and methodological frameworks will be used to address issues in science curriculum, learning, teaching, assessment and evaluation, and policy issues in both K-14 formal and informal venues in different contexts.

Chair: **Rona Robinson-Hill**
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Secretary: **Romola Bernard**
romola.bernard@ung.edu

Treasurer: **Stanton Bedford**
sbelfor2@utsouthern.edu

LATINO/A RIG (LARIG)

The Latino/a RIG supports social networks that further research agendas regarding Latino/a science learners. LARIG also serves as a support and mentoring alcoba (space) for Latin@s/Latino science educators and others interested in Latin@ science education.

Chair: **Angela Chapman**
Angela.chapman@utrgv.edu

Co-Chair: **Uma Ganesan**
uma.ganesan@utrgv.edu

Contemporary Methods for Science Education Research

The broad purpose of this RIG is to advance the mission of NARST by maintaining the rigor of science education studies, as well as promoting more standardized research practices across the organization such that we are better able to learn from and synthesize each other's work. The intent is that these outcomes will, in turn, allow us to keep advancing the field and maintain the relevance of our research to improving science teaching and learning.

Chair: **Robert Talbot**
robert.talbot@ucdenver.edu

Co-Chair: **Bina Vanmali**
bina@asu.edu

Engineering Education RIG (ENE-RIG)

The purpose of the RIG in Engineering Education is to synergize research in science and engineering education, promote rigorous research in engineering education, and provide a collaboration and discussion space supporting intellectual and professional exchange and networking.

Chair: **Monica Cardella**
mcardell@fiu.edu

Indigenous Science Knowledge Research Interest Group (ISK-RIG)

The ISK-RIG was set up to showcase and provide support to current and future research works of a growing number of Indigenous Knowledge Systems (IKS) researchers working within indigenous communities throughout the world who are members of NARST. This group includes active members from Africa and the African Diaspora, Alaska, Australia, Canada, Indigenous populations of the Americas, Asia and the Pacific, the Middle East, Thailand, Nordic Regions, New Zealand, Scandinavia, the West and East Indies, etc. The goal is to increase awareness of what indigenous knowledge systems can contribute to research.

Chair: **Sharon Nelson-Barber**
snelson@wested.org
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Treasurer: **Julie Robinson**
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Research in Artificial Intelligence-Involved Science Education (RAISE)

This RAISE RIG aims at employing AI to extend the landscape of science education, increase the capacity of all participants in the venture to face worldwide challenges, and significantly address the equity and ethical problems in the world broadly. This RIG will **(a)** support cutting-edge innovations using AI to address learning, teaching, assessment, equity and policy issues in science education; **(b)** communicate the cutting-edge research involving AI to all researchers, practitioners, and policymakers; and **(c)** encourage junior scholars in the field to pursue AI innovations within science education research as it is broadly practiced.

Chair: **Xiaoming Zhai**
Xiaoming.zhai@uga.edu
Co-Chair: **Kent J. Crippen**
kcrippen@coe.ufl.edu

Asian and Pacific Islander Science Education Research (APISER)

The APRSER RIG will promote diversity, equity, and inclusion in science education research using the lenses relevant to Asian and pacific islander cultures, ethnicities, gender, and class, as well as the intersections of these markers. It will also serve as an intellectual network to support and mentor current and future Asian and Pacific Islander scholars within and outside of the United States, including NARST members interested in API related research endeavors.

Dr. Hosun Kang
hosunk@uci.edu
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Lesbian, Gay, Bisexual, Transgender, Queer, Plus Science Education Research Group (LGBTQ +)

This RIG provides opportunities for science education researchers to explore and discuss issues relevant to the LGBTQ+ community related to a wide range of topics including science curriculum, learning, teaching, assessment or evaluation, and policy issues in both K-16 formal and informal educational contexts. RIG members promote diversity, equity, and inclusion in science education and science education research. The LGBTQ+ RIG serves as a peer support, mentoring, and inclusive space for folks who identity as LGBTQ+. The LGBTQ+ RIG provides a formalized space inclusive of queer folk and queer research.

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Strand Key

Strand 1:	**Science Learning: Development of Student Understanding**
Strand 2:	**Science Learning: Contexts, Characteristics, and Interactions**
Strand 3:	**Science Teaching—Primary School: Characteristics and Strategies** (Grades PreK-6)
Strand 4:	**Science Teaching—Middle and High School: Characteristics and Strategies** (Grades 5-12)
Strand 5:	**College Science Teaching and Learning** (Grades 13-20)
Strand 6:	**Science Learning in Informal Contexts**
Strand 7:	**Pre-service Science Teacher Education**
Strand 8:	**In-service Science Teacher Education**
Strand 9:	**Discontinued**
Strand 10:	**Curriculum, Evaluation, and Assessment**
Strand 11:	**Cultural, Social, and Gender Issues**
Strand 12:	**Technology for Teaching, Learning, and Research**
Strand 13:	**History, Philosophy, Sociology, and Nature of Science**
Strand 14:	**Environmental Education and Sustainability**
Strand 15:	**Policy, Reform and Program Evaluation**

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Strand 1: Science Learning—Development of Student Understanding

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Strand 2: Science Learning—Contexts, Characteristics and Interactions

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Strand 11: Cultural, Social, and Gender Issues

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Strand 12: Technology for Teaching, Learning, and Research

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Strand 13: History, Philosophy, Sociology, and Nature of Science

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Strand 14: Environmental Education and Sustainability

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Qiuyu Lin
Tzung-Jin Lin
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Shiang-Yao Liu
Melissa Livingston
Silvia Lizette Ramos
Peter Locher
Daniela Lopes Scarpa
Sarah Losoya
Christine Lotter
Pamela Lottero-Perdue
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Shanshan Lu
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Krista Lucas
April Luehmann
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S M Mushfiquer Rahman Ashique
Jennifer M. Bateman
Aihanh Maasen
Yetunde Mabadeje
Nessrine Machaka
Anna MacPherson
Lauren Madden
Seungho Maeng
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Letícia Marinho
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Franklin U. Onowugbeda
Bhaskar Upadhyay
Annette Upmeier zu Belzen
Maya Usher
Muhammad Usman Ijaz
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Angie Valbuena Rojas
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Malka van Dijk
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Dana Vedder-Weiss
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Andreas Vorholzer
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Aditi Wagh
Lauren Wagner
Steffen Wagner
Noemi Waight
Joi Walker
Jamie Wallace
Megan Walser
Crystal Wang
Jianlan Wang
Lu Wang
Mengqian Wang
Song Wang
Yangchunxiao Wang
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Pirchi Waxman
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Matthew Weinstein
Kristen Wendell
Julianne Wenner
Laura Wheeler
Lindsay Wheeler
Jeanna Wieselmann
Hopegay Williams
Michele Williams
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Matthew Wilsey
Kerri Wingert
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Stephen Witzig
Nicole Wong
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Ti'Era Worsley
Jingyun Wu
Meng-Yang Wu
Christine Wusylko
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Yong Xie
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NARST Presidents

1928 **W. L. Eikenberry**
1929 **W. L. Eikenberry**
1930 **W. L. Eikenberry**
1931 **Elliot R. Downing**
1932 **Elliot R. Downing**
1933 **Francis D. Curtis**
1934 **Ralph K. Watkins**
1935 **Archer W. Hurd**
1936 **Gerald S. Craig**
1937 **Walter G. Whitman**
1938 **Hanor A. Webb**
1939 **John M. Mason**
1940 **Otis W. Caldwell**
1941 **Harry A. Carpenter**
1942 **G. P. Cahoon**
1943 **Florence G. Billig**
1944 **Florence G. Billig**
1945 **Florence G. Billig**
1946 **C. L. Thield**
1947 **Earl R. Glenn**
1948 **Ira C. Davis**
1949 **Joe Young West**
1950 **N. Eldred Bingham**
1951 **Betty Lockwood**
1952 **Betty Lockwood**
1953 **J. Darrell Barnard**
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1955 **Kenneth E. Anderson**
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1957 **Waldo W. Blanchet**
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1962 **Herbert A. Smith**
1963 **Ellsworth S. Obourn**
1964 **Cyrus W. Barnes**
1965 **Frederic B. Dutton**
1966 **Milton P. Pella**
1967 **H. Craig Sipe**
1968 **John M. Mason**
1969 **Joseph D. Novak**
1970 **Willard D. Jacobson**
1971 **Paul D. Hurd**
1972 **Frank X. Sutman**
1973 **J. David Lockard**
1974 **Wayne W. Welch**
1975 **Robert E. Yager**
1976 **Ronald D. Anderson**
1977 **O. Roger Anderson**
1978 **Roger G. Olstad**
1979 **James R. Okey**
1980 **John W. Renner**
1981 **Stanley L. Helgeson**
1982 **Stanley L. Helgeson**
1983 **Carl F. Berger**
1984 **Ann C. Howe**
1985 **Ertle Thompson**
1986 **David P. Butts**
1987 **James P. Barufaldi**
1988 **Linda DeTure**
1989 **Patricia Blosser**
1990 **William G. Holliday**
1991 **Jane Butler Kahle**
1992 **Russell H. Yeany**
1993 **Emmett L. Wright**
1994 **Kenneth G. Tobin**
1995 **Dorothy L. Gabel**
1996 **Barry J. Fraser**
1997 **Thomas R. Koballa, Jr.**
1998 **Audrey B. Champagne**
1999 **Joseph S. Krajcik**
2000 **David F. Treagust**
2001 **Sandra K. Abell**
2002 **Norman G. Lederman**
2003 **Cheryl L. Mason**
2004 **Charles W. (Andy) Anderson**
2005 **John R. Staver**
2006 **James A. Shymanksy**
2007 **Jonathan F. Osborne**
2008 **Penny J. Gilmer**
2009 **Charlene M. Czerniak**
2010 **Richard A. Duschl**
2011 **Dana L. Zeidler**
2012 **J. Randy McGinnis**
2013 **Sharon J. Lynch**
2014 **Lynn A. Bryan**
2015 **Valarie L. Akerson**
2016 **Mary M. Atwater**
2017 **Mei-Hung Chiu**
2018 **Barbara Crawford**
2019 **Gail Richmond**
2020 **Tali Tal**
2021 **Eileen R. C. Parsons**
2022 **Renée Schwartz**
2023 **Gillian Roehrig**
2024 **Jomo Mutegi**
2025 **Jerome Shaw**

NARST Executive Directors

(NARST created the position of Executive Secretary in 1975; the title was changed to Executive Director in 2003)

1975–1980 **Paul Joslin**
1980–1985 **Bill Holliday**
1985–1990 **Glenn Markle**
1990–1995 **John Staver**
1995–2000 **Art White**
2000–2002 **David Haury**
2002–2007 **John Tillotson**
2007–2017 **Bill Kyle**
2018–2021 **Helen Schneider Lemay**
2021–2024 **Lisa Martin-Hansen**
2024–Present **Mackenzie Kelley**

JRST Editors

1963–1966 **J. Stanley Marshall**
1966–1968 **H. Craig Sipe**
1969 **James T. Robinson**
1970–1974 **O. Roger Anderson**
1975–1979 **David P. Butts**
1980–1984 **James A. Shymansky**
1985–1989 **Russell H. Yeany, Jr.**
1990–1993 **Ronald G. Good**
1994–1999 **William C. Kyle, Jr.**
1999–2001 **Charles W. (Andy) Anderson**
James J. Gallagher
August
2002–2005 **Dale R. Baker**
Michael D. Piburn
2006–2010 **J. Randy McGinnis**
Angelo Collins
2011–2015 **Joseph S. Krajcik**
Angela Calabrese Barton
2016–2020 **Fouad Abd-El-Khalick**
Dana L. Zeidler
2021–2025 **Felicia Moore Mensah**
Troy Dow Sadler
2026–2030 **Matthew Kloser**
Edna Tan
Dana Vedder-Weiss

Emeritus Members

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John Bencze
Glenn Berkheimer
Lowell Bethel
George Bodner
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John Christopher
Julia Clark
Barbara Crawford
David Crowther
Helmut Dahncke
George De Boer
Onno De Jong
Robert Dehaan
Rodney Doran
Dewey Dykstra
Larry Enochs
Elsa Feher
Allan Feldman
Patricia Friedrichsen
Uri Ganiel
George Glasson
Richard Haney
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Peter Hewson
Todd Hill
Avi Hofstein
Jack Holbrook
William Holliday
William Jaffarian
Joseph Jesunathadas
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Aviva Klieger
Gerald Krockover
William Kyle
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Gottfried Merzyn
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Mansoor Niaz
Obed Norman
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Donald Schmidt
Manuel Sequeira
Robert Sherwood
James Shymansky
Ellen Simmons
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Elke Sumfleth
Dennis Sunal
J. Swift
Marlene Thier
Herbert Thier
Andree Tiberghien
Sue Tunnicliffe
Ed Van Den Berg
Richard Walding
Wayne Welch
Robert Williams
Mark Windschitl
Larry Yore
Uri Zoller

NARST Award Recipients

Distinguished Contributions to Science Education through Research Award

This award is presented at the Annual International Conference but is bestowed only when an outstanding candidate, or candidates, has been identified. It is given to recognize individuals who, through research over an extended period of time, have made outstanding and continuing contributions, provided notable leadership, and made a substantial impact in the area of science education.

Year	Awardee(s)
1986	Anton E. Lawson
1987	Paul DeHart Hurd
1988	John W. Renner
1989	Willard Jacobson
1990	Joseph D. Novak
1991	Robert L. Shrigley
1992	Pinchas Tamir
1993	Jack Easley, Jr.
1994	Marcia C. Linn
1995	Wayne W. Welch
1996	Carl F. Berger
1997	Rosalind Driver
1998	James J. Gallagher
1999	Peter J. Fensham
2000	Jane Butler Kahle
2001	John K. Gilbert
2002	Audrey B. Champagne
2003	Barry J. Fraser
2004	Robert E. Yager Paul Black
2005	John C. Clement
2006	David Treagust
2007	Kenneth Tobin
2008	Dorothy Gabel
2009	Peter W. Hewson Leonie Jean Rennie Wolff-Michael Roth
2010	Reinders Duit Joseph Krajcik
2011	Norman Lederman
2012	Charles W. (Andy) Anderson Larry Yore
2013	Dale R. Baker
2014	Glen Alkenhead Richard Gunstone Frances Lawrenz
2015	Richard A. Duschl Meshach Mobolaji Ogunniyi
2016	Lynn D. Dierking John N. Falk Dana L. Zeidler
2017	Avi Hofstein
2018	Marissa Rollnick Jonathan Osborne
2019	Mary M. Atwater Maria Pilar Jiménez-Aleixandre
2020	Judy Dori Saouma Bou Jaoude
2021	Valarie Akerson Greg Kelly
2022	Fouad Abd-El-Khalick Gail Jones
2023	Franz X. Bogner Okhee Lee
2024	Angela Calabrese Barton Julie Luft
2025	Sherry Southerland

NARST Award Recipients

Outstanding Doctoral Research Award (Sponsored by Wiley)

This award is given annually for the Doctoral Research judged to have the greatest significance in the field of science education from among all theses and dissertations nominated this year for the award.

Year	Awardee(s)	Advisor(s)
1992	Rene Stofflett	Dale R. Baker
1993	Julie Gess-Newsome	Norman G. Lederman
1994	Carolyn W. Keys	Burton E. Voss
1995	Jerome M. Shaw	Edward Haertel
1996	Christine M. Cunningham	William L. Carlsen
1997	Jane O. Larson	Ronald D. Anderson
1998	Kathleen Hogan	Bonnie K. Nastasi
1999	Fouad Abd-El-Khalick	Norman G. Lederman
2000	Danielle Joan Ford	Annemarie S. Palinscar
2001	Iris Tabak	Brian Reiser
2002	Mark Girod	David Wong
2003	Hsin-Kai Wu	Joseph Krajcik
2004	David L. Fortus	Ronald Marx Joseph Krajcik
2005	Thomas Tretter	Gail M. Jones
2006	Stacy Olitsky	Kenneth Tobin
2007	Julia Plummer	Joseph S. Krajcik
2008	Victor Sampson	Douglas Clark
2009	Lei Liu	Cindy E. Hmelo-Silver
2010	Heather Toomey	Phillip Bell Zimmerman
2011	Jeffrey J. Rozelle	Suzanne M. Wilson
2011	Catherine Eberbach	Kevin Crowley
2012	Melissa Braaten	Mark Windschitl
2013	Lori Fulton	Jian Wang
2014	Daniel Birmingham	Angela Calabrese Barton Anne-Lise Halvorsen
2015	Allison Godwin	Geoffrey Potvin
2016	Anna MacPherson	Jonathan Osborne
2017	Anita Schuchardt	Christian Schunn
2018	Katherine Wade-Jaimes	Renée Schwartz
2019	Anita S. Tseng	Jonathan F. Osborne
2020	Netta Shaby	Orit Ben Zvi-Assaraf
2021	Eben Witherspoon	Christian D. Schunn
2022	Won Jung Kim	Angela Calabrese Barton Alicia Alonzo
2023	Gary William Wright III	Cesar Delgado
2024	Grace P. Carroll K. "Ren" Rende Mendoza	Soonhye Park Carla Johnson
2025	Sam Lee Daniel R. Pimentel	Katherine L. McNeill Janet Carlson and Bryan Brown

NARST Award Recipients

Early Career Research Award

The Early Career Research Award is given annually to the early researcher who demonstrates the greatest potential to make outstanding and continuing contributions to research in science education. The recipient will have received his/her Doctoral degree within five years of receiving the award.

Year	Awardee(s)
1993	Wolff-Michael Roth
1994	Deborah J. Tippins
1995	Nancy B. Songer
1996	Mary B. Nakhleh
1997	Peter C. Taylor
1998	J. Randy McGinnis
1999	Craig W. Bowen Gregory J. Kelly
2000	Angela Calabrese Barton
2001	Julie A. Bianchini
2002	Alan G. Harrison
2003	Fouad Abd-El-Khalick
2004	Grady J. Venville
2005	Randy L. Bell
2006	Heidi Carlone
2007	Bryan A. Brown
2008	Hsin-Kai Wu
2009	Troy D. Sadler
2010	Thomas Tretter
2011	Katherine L. McNeill
2012	Victor Sampson
2013	Alandeom W. Oliveira
2014	Cory Forbes
2015	Benjamin C. Herman
2016	Richard L. Lamb
2017	Ying-Chih Chen David Stroupe
2018	Doug Lombardi
2019	Hosun Kang Eve Manz
2020	Brian Donovan Dana Vedder Weiss
2021	Lama Jaber
2022	Maria González-Howard Laura Zangori
2023	Natalie S. King Christina Krist
2024	K.C. Busch Terrell R. Morton
2025	Marcus Kubsch

NARST Fellows Award

The NARST Fellow Program is an award program that honors and recognize excellence in science education research and service. This program promotes and advances the NARST mission in science education, and the role of science education in the local and global community, by designating NARST members as Fellows.

Year	Awardee(s)
2021	Bryan A. Brown
2021	Richard A Duschl
2021	Gillian Roehrig
2022	Peter A. Okebukola
2023	Julie Bianchini
2023	Ron Blonder
2023	Patricia Friedrichsen
2024	Elizabeth Mavhunga
2024	Carla Zembal-Saul
2024	Renee' Schwartz
2024	Christina Schwarz
2024	Lynn Bryan
2025	Janet Carlson
2025	M. Gail Jones
2025	Hosun Kang
2025	Katherine L. McNeill
2025	Felicia Moore Mensah
2025	Eileen Parsons
2025	Bhaskar Upadhyay

Excellence in Mentoring Award

Year	Awardee(s)
2024	Janet Carlson
2025	Ron Blonder

Future NARST Meeting Dates

2026 April 18 - 21 | Seattle, WA

2027 March 14 - 17 | Boston, MA

NARST Award Recipients

The *Journal of Research in Science Teaching (JRST)* Award

The *JRST* Award was awarded annually to the author or authors of the *Journal of Research in Science Teaching* article judged to be the most significant publication for the Volume year. It was awarded annually between 1974 and 2015.

Year	Awardee(s)
1974	Donald E. Riechard Robert C. Olson
1975	Mary Budd Rowe
1976	Marcia C. Linn Herbert C. Thier
1977	Anton E. Lawson Warren T. Wollman
1978	Dorothy L. Gabel J. Dudley Herron
1979	Janice K. Johnson Ann C. Howe
1980	John R. Staver* Dorothy L. Gabel* Linda R. DeTure
1981	William C. Kyle, Jr.
1982	Robert G. Good* Harold J. Fletcher* F. David Boulanger
1983	Jack A. Easley, Jr.
1984	Marcia C. Linn Cathy Clement Stephen Pulos
1985	Julie P. Sanford
1986	Anton E. Lawson
1987	Russell H. Yeany Kueh Chin Yap Michael J. Padilla
1988	Kenneth G. Tobin James J. Gallagher
1988	Robert D. Sherwood* Charles K. Kinzer* John D. Bransford* Jeffrey J. Franks* Anton E. Lawson*
1989	Glen S. Aikenhead
1990	Richard A. Duschl Emmett L. Wright
1991	E. P. Hart I. M. Robottom
1992	John R. Baird Peter J. Fensham Richard E. Gunstone Richard T. White
1993	Nancy R. Romance Michael R. Vitale
1994	E. David Wong
1995	Stephen P. Norris Linda M. Phillips
1996	David F. Jackson, Elizabeth C. Doster Lee Meadows Teresa Wood
1997	C. W. J. M. Klassen P. L. Linjse
1998	Julie Bianchini
1999	Phillip M. Sadler
2000	Allan G. Harrison J. Grayson David F. Treagust
2001	Fouad Abd-El-Khalick Norman G. Lederman
2002	Andrew Gibert Randy Yerrick
2003	Sofia Kesidou Jo Ellen Roseman
2004	Jonathan Osborne Sue Collins Mary Ratcliffe Robin Millar Richard Duschl
2005	Jonathan Osborne Sibel Erduran Shirley Simon
2006	Troy D. Sadler Dana L. Zeidler
2007	Jerome Pine Pamela Aschbacher Ellen Roth Melanie Jones Cameron McPhee Catherine Martin Scott Phelps Tara Kyle Brian Foley
2008	Christine Chin
2009	Kihyun Ryoo Bryan Brown
2010	Helen Patrick Panayota Mantzicopoulos Ala Samarapungavan
2011	Daphne Minner Jeanne Century Abigail Jurist Levy
2012	Julie A. Luft Jonah B. Firestone Sissy S. Wong Irasema Ortega Krista Adams Eun Jin Bang
2013	Edys S. Quellmalz Michael J. Timms Matt D. Silberglitt Barbara C. Buckley
2014	Joseph Taylor Susan Kowalski Christopher Wilson Stephen Getty Janet Carlson
2015	Matthew Kloser

*Tie

NARST Award Recipients

The NARST Outstanding Paper Award

The NARST Outstanding Paper Award was awarded annually for the paper or research report presented at the NARST Annual International Conference that was judged to have the greatest significance and potential in the field of science education. It was awarded annually between 1975 and 2015.

Year	Awardee(s)
1975	John J. Koran
1976	Anton E. Lawson
1977	*NO AWARD*
1978	Rita Peterson
1979	Linda R. DeTure
1980	M. James Kozlow Arthur L. White
1981	William Capie Kenneth G. Tobin Margaret Boswell
1982	F. Gerald Dillashaw James R. Okey
1983	William C. Kyle, Jr. James A. Shymansky Jennifer Alport
1984	Darrell L. Fisher Barry J. Fraser
1985	Hanna J. Arzi* Ruth Ben-Zvi* Uri Ganiel* Russell H. Yeany Kueh Chin Yap Michael J. Padilla
1986	Barry J. Fraser* Herbert J. Walberg* Wayne W. Welch*
1987	Robert D. Sherwood
1988	Barry J. Fraser Kenneth G. Tobin
1989	James J. Gallagher Armando Contreras
1990	Patricia L. Hauslein Ronald G. Good Catherine Cummins
1991	Nancy R. Romance Michael Vitale
1992	Patricia Heller Ronald Keith Scott Anderson
1993	Wolff-Michael Roth
1994	Wolff-Michael Roth Michael Bowen
1995	Wolff-Michael Roth
1996	Nancy J. Allen
1997	*NO AWARD*
1998	Wolff-Michael Roth Reinders Duit Michael Komorek Jens Wilbers
1999	Lynn A. Bryan
2000	Joseph L. Hoffman Joseph S. Krajcik
2001	Allan G. Harrison
2002	Carolyn Wallace Keys Eun-Mi Yang Brian Hand Liesl Hohenshell
2003	Wolff-Michael Roth
2004	Joanne K. Olson* Sharon J. Lynch* Joel Kuipers Curtis Pyke Michael Szesze
2005	Chi-Yan Tsui David Treagust
2006	Leema Kuhn Brian Reiser
2007	Eugene L. Chiappetta Tirupalavanam G. Ganesh Young H. Lee Marianne C. Phillips
2008	Guy Ashkenazi Lana Tockus-Rappoport
2009	Jrene Rahm
2010	Mark W. Winslow John R. Staver Lawrence C. Sharmann
2011	Matthew Kloser
2012	Shelly R. Rodriguez Julie Gess-Newsome
2013	Edward G. Lyon
2014	Ying-Chih Chen Soonhye Park Brian Hand
2015	Lori M. Ihrig Michael P. Clough Joanne K. Olson

*Tie

NARST Award Recipients

Outstanding Masters Thesis Award

This award was established in 1995 to be given annually for the Master's Thesis judged to have the greatest significance in the field of science education. It was last awarded in 2002.

Year	Awardee	Major Professor	Advisor
1995	Moreen K. Travis	Carol L. Stuessy	
1996	Lawrence T. Escalada	Dean A. Zollman	
1997	C. Theresa Forsythe	Jeffrey W. Bloom	
1998	Renee D. Boyce		Glenn Clark
1999	Andrew Gilbert		Randy K. Yerrick
2000	Rola Fouad Khishfe		Fouad Abd-El-Khalick
2002	Laura Elizabeth Slocum		Marcy Hamby Towns

Classroom Applications Award

The Classroom Applications Award was established in 1979. The award was given annually to authors whose papers were presented at the previous NARST Annual International Conference and judged to be outstanding in terms of emphasizing classroom application of research in science education. The award was last presented in 1991.

Year	Awardee(s)
1980 *Five Equal Awards*	Livingston S. Schneider John W. Renner
	Heidi Kass Allan Griffiths
	Ramona Saunders Russell H. Yeany
	Joe Long James R. Okey Russell H. Yeany
	M. James Kozlow Arthur L. White
1981 *Four Equal Awards*	Dorothy L. Gabel Robert D. Sherwood Larry G. Enochs
	Wayne Welch Ronald D. Anderson Harold Pratt
	Mary Ellen Quinn Carolyn Kessler
	P. Ann Miller Russell H. Yeany
1982 *Four Equal Awards*	Louise L. Gann Seymour Fowler
	Dorothy L. Gabel Robert D. Sherwood
	Thomas L. Russell
	Joseph C. Cotham
1983	Robert D. Sherwood Larry G. Enochs Dorothy L. Gabel
1984 *Three Equal Awards*	Mary Westerback Clemencia Gonzales Louis H. Primavera
	Kenneth G. Tobin Hanna J. Arzi Ruth Ben-Zvi Uri Ganiel
	Charles Porter Russell H. Yeany
1985 *Three Equal Awards*	Dan L. McKenzie Michael J. Padilla
	Margaret Walkosz Russell H. Yeany
	Kevin C. Wise James R. Okey
1986 *Four Equal Awards*	Sarath Chandran David F. Treagust Kenneth G. Tobin
	Darrell L. Fisher Barry J. Fraser
	Dorothy L. Gabel Stanley L. Helgeson Joseph D. Novak John Butzow V. K. Samuel
	Linda Cronin Meghan Tweist Michael J. Padilla
1987	Dorothy L. Gabel V. K. Samuel Stanley L. Helgeson Saundra McGuire Joseph D. Novak John Butzow
1988	Uri Zoller Ben Chaim
1989	James D. Ellis Paul J. Kuerbis
1990	Dale R. Baker Michael D. Piburn Dale S. Niederhauser
1991	David F. Jackson Billie Jean Edwards Carl F. Berger

NARST Standing Committees

Awards Committee	
Final Year	**Board Liaison**
2025	**Amelia Wenk Gotwals** Michigan State University

Outstanding Doctoral Research Award	
Final Year	**Committee Leadership**
2025	**David C. Owens** (Chair) University of Montana
2026	**Dina Tsybulsky** (Co-Chair) Technion, Israel
	Members
2025	**Eunjin Bahng** Iowa State University
2025	**Maia Elkana** Washington University in St. Louis
2025	**Guopeng Fu** East China Normal University
2025	**Nilay Ozturk** Kirsehir Ahi Evran University, Turkey
2026	**Mindy Chappell** Portland State University
2026	**Colby Tofel-Grehl** Utah State University
2026	**Annabel Stoler** Boston University
2026	**David Stroupe** Michigan State University
2026	**Noemi Waight** University at Buffalo
2026	**Stephanie Batres Spezza** Univeristy of Illinois - Chicago
2027	**Mary Short** George Washington University
2027	**Julianne Wenner** Clemson University

Early Career Research Award	
Final Year	**Committee Leadership**
2025	**Bridget Miller** (Chair) University of South Carolina
	Members
2025	**Eleanor Abrahms** University of Massachusetts Lowell
2025	**Ben Herman** Texas A&M University
2026	**Katherine Doerr** Mount Aloysius College
2026	**Katherine Doerr** Malmo University, Sweden
2026	**Uchenna Emenaha** The University of Texas at San Antonio
2026	**Laura Zangori** University of Missouri
2027	**Meg Blanchard** North Carolina State University
2027	**Hyesun You** University of Iowa
2027	**Gary William Wright** University of Missouri
2027	**Elizabeth (Betsy) Davis** University of Michigan

NARST Standing Committees

Awards Committee (cont.)

Distinguished Contributions to Science Education Through Research

Final Year	Committee Leadership
2025	**Mei-Hung Chiu** (Chair) National Taiwan University
2026	**Saouma BouJaoude** (Co-Chair) American University of Beirut, Lebanon
	Members
2025	**Justin Dillon** Exeter University, UK
2025	**Kathy Trundle** Utah State University
2026	**Carla Johnson** NC State University
2026	**Gail Jones** NC State University
2027	**Okhee Lee** New York University
2027	**Fouad Abd-El-Khalick** University of North Carolina-Chapel Hill
2027	**Greg Kelly** Pennsylvania State University

NARST Fellow Award

Final Year	Committee Leadership
2025	**Enrique (Henry) Suarez** (Chair) University of Massachusetts, Amherst
2025	**Lezly Taylor** (Co-Chair) Virginia Polytechnic Institute and State University
	Members
2026	**Helena Aptyka** University of Cologne, Germany
2026	**Flavia Kigozi** University of Witwatersrand, South Africa
2026	**Laura B. Schneider** St. Mary's College of Maryland, OpenSciEd
2027	**Ron E. Gray** Northern Arizona University
2027	**Peter Okebukola** Lagos State University

Elections Committee

Final Year	Committee Leadership
2026	**Nazan U. Bautista** (Chair) Miami University
2027	**Muhammad Abd Hadi Bunyamin** (Incoming Chair) Universiti Teknologi Malaysia
2025	**David Crowther** (Outgoing Chair) University of Nevada, Reno
	Members
2025	**Holly Kennedy Amerman** University of Georgia
2025	**Carina Rebello** Purdue University-Main Campus
2026	**Angela Chapman** University of Texas Rio Grande Valley
2026	**Susie M. Cohen** Trinity International University
2026	**Tim Klavon** Black Hills State University
	Board Member Liaison
2027	**Heba EL-Deghaidy** American University in Cairo

NARST Standing Committees

Equity and Ethics Committee	
Final Year	**Committee Leadership**
2026	**Regina McCurdy** (Chair) Georgia Southern University
2025	**Justice T. Walker** (Outgoing Chair) University of Texas at El Paso
2027	**Iliana Esther De La Cruz** (Incoming Chair) Texas A&M University
	Members
2025	**Marsha E Simon** University of West Georgia
2026	**Laura Peña-Telfer** Georgia State University
2027	**Devasmita (Deva) Chakraverty** Indian Institute of Management Ahmedabad
2027	**Dominick Fantacone** SUNY Cortland Director of Research and Sponsored Programs
2027	**Maria R. Maulucci** Barnard College
2027	**Khanh Q. Tran** Purdue University
	Board Member Liaison
2025	**Sharon Nelson-Barber** WestEd

External Policy and Relations Committee	
Final Year	**Committee Leadership**
2025	**Ellen Granger** (Chair) Florida State University
2026	**Mark Meszaros** (Co-Chair) Carolina Biological Supply Company
	Members
2026	**Christina Baze** The University of Texas at Austin
2026	**Allison Esparza** Texas A&M University

External Policy and Relations Committee (cont.)	
2026	**Brittany Gavrin Hudson** University of Mary Washington
2027	**Julie Bianchini** University of California, Santa Barbara
2027	**Zoubeida R. Dagher** University of Delaware
	Board Liaison
2027	**Kristin Gunckel** University of Arizona

Membership Committee	
Final Year	**Committee Leadership**
2025	**Melanie Kinskey** (Chair) Texas A&M University
2026	**Joi Merritt** (Co-Chair) James Madison University
	Members
2025	**Harini Krishnan** University of Utah
2025	**Mihwa Park** Texas Tech University
2025	**Harleen Singh** University of Georgia
2026	**Jonathan Bowers** Michigan State University
2026	**Alyssa Freeman** Middle Tennessee State University
2026	**Grant Gardner** Middle Tennessee State University
2027	**Ilayda Kilic** Kocaeli University, Turkey
2027	**Theila Smith** Brooklyn College
	Board Liaison
2026	**S. Selcen Guzey** Purdue University

NARST Standing Committees

Graduate Student Committee

The Graduate Student Committee is composed of graduate student members appointed by the President-elect. The committee is chaired by the Graduate Student Representative, a non-voting (ex-officio) liaison to the NARST Board. A Board Director is appointed to serve as an ex officio advisor to the committee.

Final Year	Graduate Student Coordinator
2025	**Jennifer Bateman** (Chair) University of Georgia
	Committee Leadership
2025	**Savannah Hayes** (Co-Chair) Space Center Houston
2026	**Alexander Eden** (Co-Chair) Florida International University
	Members
2025	**Deborah Cotta** Universidad Federal de Minas Gerais, Brasil
2025	**Beyza Okan** Bogazici University
2025	**Amy Padolf** Florida International University
2025	**Mutiara Syifa** Illinois State University
2025	**Johan Tabora** Northwestern University
2026	**Brandin Conrath** Virginia Commonwealth University
2026	**Austin R. Jenkins** Purdue University
2026	**Muhammad Guntur Purwanto (Guntur)** University of Minnesota
2026	**Andrea Reeder** Middle Tennessee State University
2026	**Kristal Louise Turner** University of Calgary, Canada
2026	**Lauren E. Wagner** University of North Alabama

International Committee

Final Year	International Coordinator
2025	**Mercy Ogunsola-Bandele** (Chair) National Open University of Nigeria
	Committee Leadership
2025	**Ranu Roy** (Co-Chair) Amity University Kolkata, India
2026	**Arif Rachmatullah** (Co-Chair) SRI International
	Members
2025	**Nuri Balta** Suleyman Demirel University
2025	**Aerin W. Benavides** University of North Carolina Greensboro
2025	**Imran Tufail** University of Waikato
2026	**Estelle Blanquet** University of Bordeaux - France
2026	**Christelle Fayad** Texas Christian University
2026	**Jose Pavez** University of Georgia
2027	**Sahar Alameh** University of Kentucky
2027	**Shirly Avargil** Technion Junior Faculty, Israel
2027	**Keren Dalyot** Weizmann Institute of Science, Israel
2027	**Argyris Nipyrakis** University of Chicago
2027	**Giulia Tasquier** University of Bologna, Italy

NARST Standing Committees

Program Committee	
Final Year	**Committee Leadership**
2025	**Jerome Shaw** (Chair) University of California, Santa Cruz
2026	**Jennifer D. Adams** (Co-Chair) University of Calgary, Canada
	Members
2025	**Quentin Biddy** University of Colorado, Boulder
2025	**Narendra Dadarao Deshmukh** Homi Bhabha Centre for Science Education
2025	**Daniela Fiedler** University of Copenhagen
2025	**Peng He** Michigan State University
2025	**Sophia Jeong** University of Georgia
2025	**Anne Emerson Leak** High Point University
2025	**Jing Lin** Beijing Normal University
2025	**Allison Antink-Meyer** Illinois State University
2025	**Jamie N. Mikeska** ETS
2025	**Emily Adah Miller** University of Georgia
2025	**Tara Nkrumah** Arizona State University
2025	**Rebecca Swanson** University of Nebraska-Lincoln
2025	**Preethi Titu** Kennesaw State University
2025	**Yang Yang** Qingdao University
2026	**Rouhollah Aghasaleh** California State Polytechnic University, Humboldt
2026	**Rachel van Aswegen** University of Virginia
2026	**Selina Lynn Bartels** Valparaiso University
2026	**Julie C. Brown** Univeristy of Florida
2026	**Sanlyn Buxner** University of Arizona
2026	**Mila Rosa Librea Carden** University of North Texas
2026	**Robbie. L. Higdon** James Madison University
2026	**TingTing Li** Michigan State University
2026	**Stefanie L. Marshall** Michigan State University
2026	**Kelli Paul** Indiana University
2026	**Anita Schuchardt** University of Minnesota
2026	**Quentin Sedlacek** Southern Methodist University
2026	**Jill Wertheim** WestEd
2026	**Moyu (Molly) Zhang** New York University

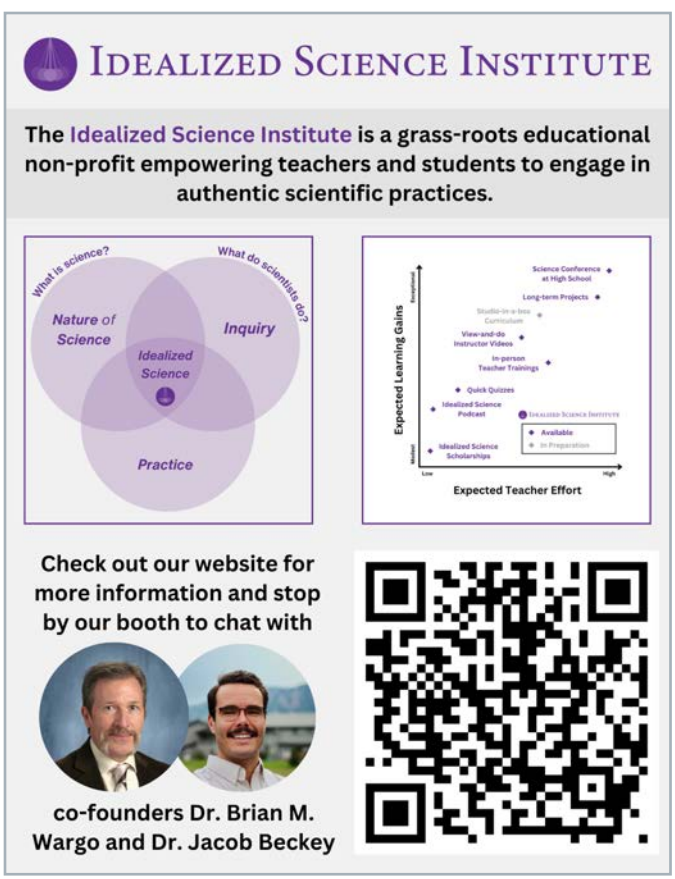
NARST Standing Committees

Publications Advisory Committee	
	Committee Leadership
2025	**Tina Vo** (Chair) University of Nevada, Las Vegas
2027	**Marcus Kubsch** (Co-Chair) Freie University-Berlin
	Members
2025	**Cesar Delgado** North Carolina State University
2025	**Li Ke** University of North Carolina Chapel Hill
2025	**Linda Morell** UC Berkeley
2026	**Eli Tucker-Raymond** Boston University
2027	**Justin McFadden** University of Louisville
2027	**Melissa Mendenhall** Utah State Board of Education
2027	**James Minogue** North Carolina State University
2027	**Samuel Severance** Northern Arizona University
2027	**Sissy Wong** University of Houston
2027	**Yewon Lee** University of Maryland at College Park
2027	**Danielle Malone** Purdue University
	Board Liaison
2026	**Shiang-Yao Liu** National Taiwan Normal University

Research Committee	
Final Year	**Committee Leadership**
2026	**Bryan H. Nichols** (Chair) Florida Atlantic University
2027	**Colby Tofel-Grehl** Utah State University
	Members
2025	**Liam Guilfoyle** University of Oxford
2025	**James Nyachwaya** North Dakota State University
2025	**Mina Sedaghatjou** Rowan University
2025	**Karen Woodruff** Kean University
2025	**Ezgi Yesilyurt** Weber State University
2026	**Alexander Bohn** Northern Virginia Community College
2026	**Saramma Chandy** Mumbai University
2026	**Michael Giamellaro** Oregon State University
2026	**Carrie-Anne Sherwood** Southern Connecticut State University
2027	**Franz X. Bogner** University of Bayreuth (Germany)
2027	**Beth A. Covitt** Univeristy of Montana
2027	**Dr. Patrice Juliet Pinder** Independent STEM Education Researcher
2028	**Stephen B. Witzig** University of Massachusetts Dartmouth
	Board Liaison
2027	**Meredith Park Rogers** Indiana University

NARST Standing Committees

Social Media, Website and Communications Committee	
Final Year	**Committee Leadership**
2026	**Gary Weiser** (Chair) Bill and Melinda Gates Foundation
2025	**Ryan Cain** (Outgoing Chair) Weber State University
2027	**Stephanie Teeter** (Co-Chair) North Carolina State University
	Members
2025	**Anna Maria Arias** Kennesaw State University
2025	**Stanton Belford** University of Tennessee Southern
2025	**Won Jung Kim** Santa Clara University
2026	**Linsey Brennan** Michigan State University
2026	**Marti Canipe** Northern Arizona University
2026	**Suzanne Poole Patzelt** Touro University
2027	**Katerina Pia Gunter** San Francisco State University
2027	**Olayinka Mohorn** University of Memphis
2027	**Christina Schwarz** Michigan State University
	Board Liaison
2026	**Patrick Enderle** Georgia State University



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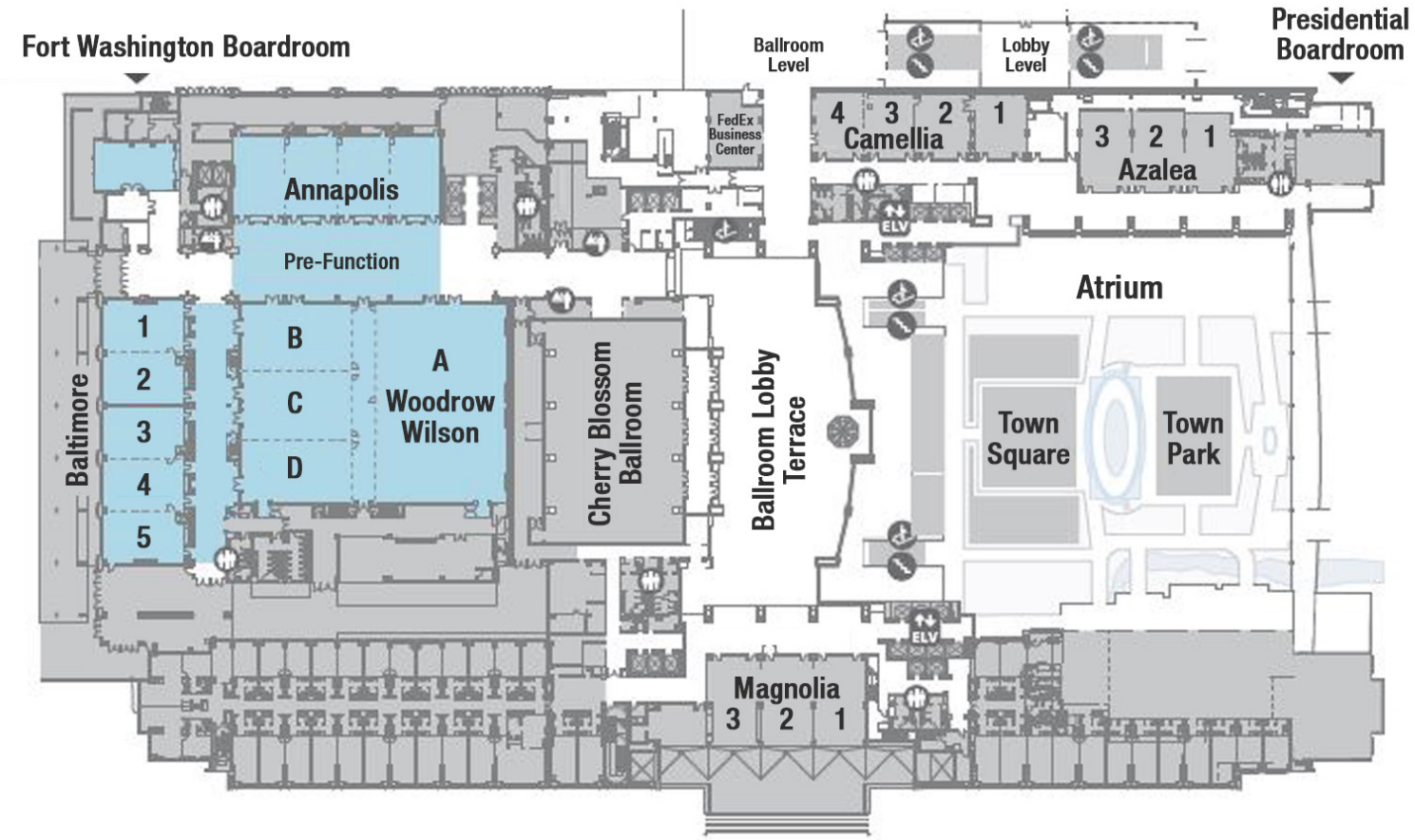
GAYLORD HOTEL MAP



NARST 2026 Conference Theme

Prepared by Jennifer D. Adams, NARST President-Elect

Joyful Transgressions and Radical Imagination in Science Education

> ***The classroom, with all its limitations, remains a location of possibility. In that field of possibility, we have the opportunity to labor for freedom to demand of ourselves and our comrades an openness of mind and heart that allows us to face reality even as we collectively imagine ways to move beyond boundaries, to transgress.***
>
> ***- Bell Hooks***

What could science teaching, learning and research look like in our wildest dreams? What could science teachers, learners, communities, and researchers be saying, thinking, doing, and feeling? What could be the priorities of science education?

Urgent times calls for radical actions and opportunities to collectively imagine different worlds and plot futures where we all can flourish. Uncertainty and global transitions create openings for radical world-building—moving beyond what is given, including the imaginations imposed by those in power. Could we dare to envision a world where everyone can thrive, where the flourishing of all humans and more-than-humans is the status quo? As such, it is imperative that we locate and create spaces of hope, imagination, and joy in science education—spaces where we re-envision how we can live well together on this pale blue dot that we call home.

The NARST 2026 Annual Meeting invites us to collectively imagine and build a world where scientific knowledge making is connected to lived experience and recorded through, as Sylvia Wynter suggests, "representational and biological feelings," and the creation of spaces where "there is unlimited access to the pleasure and power of knowing," as Bell Hooks advocates. This challenges us to re-engage with the fully human aspects of science learning considering some of the following provocations: What would happen if we considered play in science learning across contexts and lifespan? What joyful methodologies could we employ to research science learning? How could we enact care alongside students, teachers, communities, and peers in our work? What would happen if we started our projects from a place of trust and relationship-building? Given that NARST's ultimate goal is to help all learners achieve science literacy, how might we reimagine science literacy with social, environmental, and epistemological justice at its core?

This conference theme invites us to share the ways that we can transgress canonical boundaries in science education and expand dialogues on strategies for disrupting structures that sustain inequities, and in the spirit of Bell Hooks, "*[envision] new, alternative, oppositional aesthetic acts that both challenge and transcend [given] frameworks and limitations*." This conference is a step toward forging deeper connections between science and social life across formal, informal, and lived contexts—unpacking histories, reimagining relationships with science, and ultimately working toward a scientific endeavor of joyful transgressions and world-building. Together, we will envision and enact future-oriented approaches that cultivate a radical reimagining of what science education—and the world—can be.

NARST

A global organization for improving science education through research

99th NARST International Conference

Seattle | April 19-22, 2026

Joyful Transgressions and Radical Imagination in Science Education

Virtual Conference Day
13 March 2025

Opening and Welcome
13-Mar-25, 9:30 AM-10:00 AM
Location: Zoom A

Presidential Welcome

Multi-Strand Stand-Alone Paper Set 1
Strand 2: Science Learning: Contexts, Characteristics and Interactions
13-Mar-25, 10:00 AM-11:30 AM
Location: Zoom A

Stand-Alone Paper
Research on social regulation learning in collaborative socioscientific issues argumentation
Yong Xie*, Beijing Normal University, China
Yangchunxiao Wang, Beijing Normal University, China
Xingda Li*, Beijing Normal University, China
Shuhao Yang*, Beijing Normal University, China
Yonghe Zheng*,Beijing Normal University, China

Stand-Alone Paper
Supporting the Development of Scientific Arguments about Ecosystems Responses to Disturbances
Kaya Easley*, Northern Illinois University, USA
Steven McGee*, The Learning Partnership, USA
M. Britt, Northern Illinois University, USA
Amanda Durik, Northern Illinois University, USA
Randi McGee-Tekula,The Learning Partnership, USA

Stand-Alone Paper
Exploring Metaphorical Differences and Language Switching in Multilingual Students' Translanguaging: A Study on Heat Transfer
Rajashri Priyadarshini*, Indian Institute of Technology Bombay, India
Chandan Dasgupta, University of Twente, Netherlands
Sahana Murthy, Indian Institute of Technology Bombay, India

Stand-Alone Paper
Enhancing students' achievement in software development cycle through a cultural, technological and contextual pedagogy
Henry Okorie*, Africa Centre of Excellence for Innovative and Transformative STEM Education, Lagos State University, Nigeria
Uchenna Ugwuoke*, Africa Centre of Excellence for Innovative and Transformative STEM Education, Lagos State University, Nigeria
Peter Okebukola, Africa Centre of Excellence for Innovative and Transformative STEM Education, Lagos State University, Nigeria
Rasheed Sanni, Africa Centre of Excellence for Innovative and Transformative STEM Education, Lagos State University, Nigeria
Abdurrazaq Olawale,Africa Centre of Excellence for Innovative and Transformative STEM Education, Lagos State University, Nigeria

Stand-Alone Paper

Efficacy of Learning Management Systems in Cybersecurity Education in an ODeL Environment in Ghana

Felicia Nkrumah*, Lagos State University, Nigeria
Peter Okebukola, Lagos State University, Nigeria
Oluwatoyin Enikuomehin, Lagos State University, Nigeria
Emmanuel Ekwam, Lagos State University, Nigeria
Adekunle Oladejo,Lagos State University, Nigeria

Stand-Alone Paper

Middle school students' climate literacy and climate change awareness: Validation of two instruments

Nilay Ozturk*, Bahcesehir University, Turkey
Osman Aksit, Bogazici University, Turkey
Nazmiye Ertugrul, Bogazici University, Turkey
Ayse Gul Celenk, Bahcesehir University, Turkey
Naz Fulya Cibik,Mugla Sitki Kocman University, Turkey
Zeynep Aydin, Bogazici University, Turkey
Yasemin Ozdem-Yilmaz, Mugla Sitki Kocman University, Turkey
Gaye Ceyhan, Bogazici University, Turkey

Multi-Strand Stand-Alone Paper Set 2

Strand 11: Cultural, Social, and Gender Issues
13-Mar-25, 10:00 AM-11:30 AM
Location: Zoom B

Stand-Alone Paper

Collaborative Creation of Culture-Infused Chemistry Card Game for an Under-resourced College Students

Hai Vo*, University of Science, Vietnam
Le Duong*, University of Science, Vietnam
Trinh Nguyen*, University of Science, Vietnam
Anh Mai Nguyen, University of Science, Vietnam
Thuy Nguyen,University of Science, Vietnam
Hanh Dinh, Vermont State University, USA

Stand-Alone Paper

Colonial influence in shaping the science education discourse in Bangladesh

Shamnaz Arifin Mim*, McGill University, Canada

Stand-Alone Paper

Exploring the Challenges of Implementing Experiential Learning in the Secondary Level Science Curriculum: Teachers Perspective

Anika Arpa*, University of Dhaka, Bangladesh
Umme Tithi, University of Dhaka, Bangladesh
MD Baktiar Bulbul, University of Dhaka, Bangladesh

Stand-Alone Paper

Physics Teaching using technology at secondary level: A TPACK perspectives of teachers views and practice

MD Baktiar Bulbul*, University of Dhaka, Bangladesh
S M Rahman, University of Dhaka, Bangladesh
Anika Arpa, University of Dhaka, Bangladesh
Md Shahadat Khan, Islamic University of Technology, Bangladesh
Shariar Nafees Raaz,University of Dhaka, Bangladesh
Mehedi Anik, University of Dhaka, Bangladesh

Stand-Alone Paper

Harnessing the Power of Culturo-Techno-Contextual Approach plus to Transform Students' Perspectives on Food, Nutrition, Metabolism

Agyemang Okyere Darko*, Lagos State University, Nigeria
Peter Okebukola, Lagos State University, Nigeria
Franklin Onowugbeda, Lagos State University, Nigeria

Stand-Alone Paper

Secondary Level Physics Teachers' Collaborative Practices and Challenges to Promote Scientific Literacy

Shahriar Nafees Chowdhury Raaz, University of Dhaka, Bangladesh
S M Hafizur Rahman*, University of Dhaka, Bangladesh
Mehedi Hasan Anik, Côte de Azur University, France
Md Baktiar Alam Bulbul, Green University of Bangladesh, Bangladesh

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Interrogating Context in the Study of Affect and Emotion for Dignity and Justice

Strand 11: Cultural, Social, and Gender Issues
13-Mar-25, 10:00 AM-11:30 AM
Location: Zoom C

Related Paper Set

Pedagogies of Joy ;)

D Keifert*, University of North Texas, USA
Day Greenberg*, Indiana University, USA
Déana Scipio*, IslandWood, USA
Sarah Lee, University of Washington, USA

Related Paper Set

Exposing and Challenging "Grit" in Physics Education

Amy Robertson*, Seattle Pacific University, USA
Verónica Vélez, Western Washington University, USA
Trà Huynh, Western Washington University, USA
W. Hairston, Equitable Development LLC, USA

Related Paper Set

Raciolinguistic Hierarchies of Feeling in U.S. Science Education

Kathryn Kirchgasler*, University of Wisconsin–Madison, USA

Related Paper Set

'Everyone's Struggling:" Coping with Institutionalized Hierarchies of Competence Through Emotional Resonance

Muxin Zhang*, University of Illinois Urbana-Champaign, USA
Eric Kuo, University of Illinois Urbana-Champaign, USA

Related Paper Set
Affective Contradictions in Future-Oriented Science and Sustainability Education
Hanna Røkenes*, University of Oslo, Norway
Alfredo Jornet Gil*, University of Girona, Spain

Roundtable Discussions
13-Mar-25, 12:00 PM-1:30 PM
Location: Zoom A

Strand 14: Environmental Education and Sustainability
WIP Roundtable
Examining Ontarios Pre- and In-service Elementary Teachers Knowledge and Beliefs about Climate Change
Shiva Javanmardi*, The University of Western Ontario, Canada
Anton Puvirajah, The University of Western Ontario, Canada

Strand 10: Curriculum and Assessment
WIP Roundtable
From written to enacted curriculum: what topics do elementary teachers choose to teach and why?
Mariana Luzuriaga*, Universidad de San Andres, Argentina
Agustina Ollivier, Universidad de San Andres, Argentina
Melina Furman, Universidad de San Andres, Argentina

Strand 11: Cultural, Social, and Gender Issues
WIP Roundtable
A Systematic Review of Translanguaging Practices in K-12 Science Education
Zixin Zeng*, The University of Hong Kong, China

Strand 7: Pre-service Science Teacher Education
Roundtable
Utilizing Phenomenon-based Science Instruction to Enhance Preservice Teachers' Skills in Generating Hypothetico-Predictive Reasoning
Noushin Nouri*, University of Texas Rio Grande Valley, USA
Leslie Garrido, University of Texas Rio Grande Valley, USA
Saberi Maryam, Ministry of Education, Iran, Islamic Republic of
Morteza Karimi Aghbolagh, University of Texas Rio Grande Valley, USA

Strand 13: History, Philosophy, Sociology, and Nature of Science
Roundtable
Bridging the Gap: How Designed Purposes Facilitate Authentic Scientific Purposes in Citizen Science Project
Haya Ben Simon*, Technion, Israel
Dina Tsybulsky, Technion, Israel

Strand 15: Policy, Reform, and Program Evaluation
WIP Roundtable
Implementing New Science Course Pathways in Urban High School District
Claudia Castillo-Lavergne*, Rutgers University, USA
Meril Antony, Rutgers University, USA

Vandeeen Campbell, Rutgers University, USA

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies
WIP Roundtable
Unpacking Teacher Understanding of the Next Generation Science Standards through a Vignette
Min Jung Lee*, University of North Dakota, USA
Martha Inouye, University of Wyoming, USA
Meghan Macias, Wested, USA
Tugba Boz, Purdue University, USA

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
Roundtable
Science Teachers' learning from what matters students for transformative practice: A Change Laboratory study
Isaac Coffie*, University of Technology Sydney, Australia

Virtual Poster Session
13-Mar-25, 12:00 PM-1:30 PM
Location: Zoom B

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies
Poster
A Bibliometric and Content Analysis of Research in Elementary Science Education
Shuhao Yang*, Beijing normal university, China
Yang Tao, Beijing normal university, China
Dan Tao, Beijing normal university, China

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies
Poster
An Exploratory Study Assessing the Instructional Quality of Preservice Teachers' Engineering Tasks
Danielle Rhemer*, Old Dominion University, USA
Keri Parker*, Old Dominion University, USA
Samantha Myers, Old Dominion University, USA
Kristie Gutierrez, Old Dominion University, USA
Jennifer Kidd,Old Dominion University, USA

Strand 12: Technology for Teaching, Learning, and Research
Poster
Identifying Learners' Cognitive-Affective Profiles in Virtual Scientific Inquiry Practices
Shuo Feng*, Shanghai Jiao Tong University, China
Maohua Wang, Shanghai Municipal Education Commission, China
Ke Li, Shanghai Jiao Tong University, China
Shuai Wang, Shanghai Jiao Tong University, China

Strand 6: Science Learning in Informal Contexts
Poster
Embracing a Pluriversal Approach in Science Education: Racialized Multilingual Youth as Epistemic Contributors and Sensemakers
Akira Harper*, University of Massachusetts Dartmouth, USA
Shakhnoza Kayumova, University of Massachusetts Dartmouth, USA

Fernanda Minghetti Weisheimer, University of Massachusetts Dartmouth, USA
Jared Fredette, University of Massachusetts Dartmouth, USA

Strand 8: In-service Science Teacher Education
Poster
Science Teachers Visual Representations of Nature of Science through Online Reflective Collaborative Professional Development Program
Büşra Aksöz*, Bogazici University, Turkey
Ebru Kaya, Bogazici University, Turkey

Multi-Strand Stand-Alone Paper Set 3
13-Mar-25, 2:00 PM-3:30 PM
Location: Zoom A

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Stand-Alone Paper
Broadening Participation in STEM by Engaging Students in Data Science in Puerto Rico
Steven McGee*, The Learning Partnership, USA
Willow Kelleigh, The Learning Partnership, USA

Strand 7: Pre-service Science Teacher Education
Stand-Alone Paper
Integrating Historical Empathy into History of Science: Promoting Socio-Emotional Competence in Pre-Service Science Teacher.
María Paz Beltrán*, Universidad del Desarrollo, Chile
Francesca Grez, Universidad del Desarrollo, Chile

Strand 8: In-service Science Teacher Education
Stand-Alone Paper
Noticings by Principals and Their Responses to Elementary Science Lessons
Melissa Pearcy*, Washington State University, USA
Meagan Graves, Washington State University, USA
Patrick Ochieng, Washington State University, USA

Strand 8: In-service Science Teacher Education
Stand-Alone Paper
Early Childhood Teachers' Perspectives on Integrated STEM Education
Lu Wang*, Indiana University Kokomo, USA
Alina Mihai, Indiana University Kokomo, USA

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
13-Mar-25, 2:00 PM-3:30 PM
Location: Zoom A

Stand-Alone Paper
Effects of lab sequence and student preferences, combining virtual and physical labs in middle school
Amnon Levin*, Ben-Gurion University, Israel
Elon Langbeheim, Ben-Gurion University, Israel

Stand-Alone Paper Set 4

Strand 5: College Science Teaching and Learning (Grades 13-20)
13-Mar-25, 2:00 PM-3:30 PM
Location: Zoom B

Stand-Alone Paper
AI in STEAM Education: case study of visual literacy in biology and visual art drawing
Michael Ahove*, Lagos State University, Nigeria
Benjamin Onuorah*, Lagos State University, Nigeria
Peter Okebukola, Lagos State University, Nigeria
Sanni Rasheed, Lagos State University, Nigeria
Juma Shabani,University of Burundi, Burundi

Stand-Alone Paper
Improving African Students Learning Outcomes in Cybersecurity, the Culturo-Techno-Contextual Approach and Afrocyberlibrary to the Rescue.
Michael Armah, Lagos State University, Nigeria
Peter Okebukola, Lagos State University, Nigeria
Moses Akanbi, Lagos State University, Nigeria
Rasheed Saani, Lagos State University, Nigeria
Andrew Tetteh, Lagos State University, Nigeria

Stand-Alone Paper
Improving Students Interests in Cybersecurity: Will the CTCA and Afrocyberlibrary Help?
Andrew Tetteh, Lagos State University, Nigeria
Michael Armah, Lagos State University, Nigeria
Peter Okebukola, Lagos State University, Nigeria
Moses Akanbi, Lagos State University, Nigeria
Rasheed Saani, Lagos State University, Nigeria

Stand-Alone Paper
Phenomenographic Analysis to Students' Problem Solving in Introductory Physics
Ozden Sengul*, Bogazici University, Turkey
Sevde Yerisenoglu, Bogazici University, Turkey

Stand-Alone Paper
2-Year College Biology Instructor Perceptions on Mathematics in Biology Instruction
Kristine Squillace Stenlund*, University of Minnesota, USA
Anita Schuchardt, University of Minnesota, USA

Principles for Designing Science Methods Courses Toward Humanizing Science Teaching and Learning

Strand 7: Pre-service Science Teacher Education
13-Mar-25, 4:00 PM-5:30 PM
Location: Zoom A

Symposium
Principles for Designing Science Methods Courses Toward Humanizing Science Teaching and Learning
D Keifert*, University of North Texas, USA
Bethany Daniel*, Vanderbilt University, USA
Heather Johnson, Vanderbilt University, USA

Déana Scipio*, IslandWood, USA
Yaa Dankwa*,The Ohio State University, USA
Sophia Jeong, The Ohio State University, USA
Alejandra Santely, The Ohio State University, USA
Khadija Zogheib*, Florida State University, USA
Enrique Suárez, University of Massachusetts Amherst, USA
Myeongji Kim, The Ohio State University, USA

Multi-Strand Stand-Alone Paper Set 5

13-Mar-25, 4:00 PM-5:30 PM
Location: Zoom B

Strand 6: Science Learning in Informal Contexts
Stand-Alone Paper
People who have more science education rely less on misinformation when making science-related decisions
Yael Rozenblum*, Technion – Israel Institute of Technology, Israel
Keren Dalyot, Weizmann Institute of Science, Israel
Ayelet Baram- Tsabari, Technion – Israel Institute of Technology, Israel

Strand 12: Technology for Teaching, Learning, and Research
Stand-Alone Paper
Effect of Technology-Education-Art (TEA) Artificial Intelligence Model on Students' Attitude towards Biological Drawing
Benjamin Onuorah*, Lagos State University, Nigeria
Peter Okebukola*, Lagos State University, Nigeria
Michael Ahove, Lagos State University, Nigeria
Sanni Rasheed, Lagos State University, Nigeria
Juma Shabani,University of Burundi, Burundi
Franklin Onowugbeda, Lagos State University, Nigeria

Strand 13: History, Philosophy, Sociology, and Nature of Science
Stand-Alone Paper
The Impact of Teaching Based on HOS on Students' Understanding of the Nature of Science
Kadriye İnci*, METU, Turkey
Semra Sungur, METU, Turkey
Özgül Yılmaz-Tüzün, METU, Turkey

Strand 14: Environmental Education and Sustainability
Stand-Alone Paper
Pre-service Science Teachers' Place-Based Learning Experience: A Bioblitz Activity in Ihlara Valley
Nurcan Tekin, Aksaray University, Turkey
Başak Tepedelenlioğlu*, Aksaray University, Turkey

Strand 14: Environmental Education and Sustainability
Stand-Alone Paper
Relating Professional Action Competence in ESD to Sustainability Teaching Outcome Expectancy, ESD Value, Teacher Self-Regulation
Zeynep Aydin*, Bogazici University, Turkey
Sevda Yerdelen-Damar, Bogazici University, Turkey

Strand 14: Environmental Education and Sustainability
Stand-Alone Paper
Bridging Roles: Educators and High School Graduates' Sense of Climate Change.
Shaima Alokbe*, Ben-Gurion University of the Negev, Israel
Areej Nbari*, Ben-Gurion University of the Negev, Israel
Wisam Sedawi*, University of Michigan, USA
Orit Ben Zvi Assaraf, Ben-Gurion University of the Negev, Israel

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Closing remarks
13-Mar-25, 5:30 PM-6:00 PM
Location: Zoom A

In-Person Conference
23 March 2025

New Member Welcome
23-Mar-25, 7:00 AM-8:00 AM
Location: Magnolia 1

Social Event

Challenging Academic Hegemony: How Latin@ Rethink Scholarly Conventions in Science Education Research
23-Mar-25, 8:00 AM-11:45 AM
Location: Annapolis 1

Pre-Conference Workshop
Organizers
Angela Chapman, University of Texas Rio Grande Valley, USA
Alejandro Gallard , Georgia Southern University, USA
Uma Ganesan, University of Texas Rio Grande Valley, USA
Panelists
S. Lizette Ramos De Robles, Nacional de Ciencia y Tecnología, Mexico
Verónica Serrano Flores,Instituto Superior de Investigación y Docencia para el Magisterio (ISIDM), Mexico
Dulce Gonzalez Ramírez, Instituto Superior de Investigación y Docencia para el Magisterio (ISIDM), Mexico
Liliana Garcia, University of California Santa Barbara, USA
Alexander Eden, Florida International University, USA
Summer Blanco, University of Georgia, USA

Empowering Innovative Teacher-Researcher Partnerships in Switzerland: A Collaborative Approach to Strengthen the Use of Conceptual & Affective Tests in Classrooms
23-Mar-25, 8:00 AM-11:45 AM
Location: Annapolis 2

Pre-Conference Workshop
Organizer
Florian Stern, University of Geneva, Switzerland

Another Essential Partner We Need in the Mix: Building Lasting Connections Among Science Teachers, Researchers, and EdTech Innovators
23-Mar-25, 8:00 AM-11:45 AM
Location: Annapolis 3

Pre-Conference Workshop
Organizers
Megan Conrad, ExploreLearning, USA
Panelists
Megan Conrad, ExploreLearning, USA
David Kantner, ExploreLearning, USA
William Penuel, University of Colorado Boulder, USA
Stefani Stephenson,Digital Promise, USA

The Pendulum: A Gateway to Authentic Scientific Research in High School Classrooms

23-Mar-25, 8:00 AM-11:45 AM
Location: Annapolis 4

Pre-Conference Workshop
Organizers
Brian Wargo, Idealized Science, USA
Presenters
Brian Wargo, Idealized Science, USA
Jacob Beckey, University of Colorado Boulder, USA

An Introduction to the VAScoR and Using a Rubric to Qualify Responses to the Views of Nature of Science (VNOS) Questionnaire

23-Mar-25, 8:00 AM-11:45 AM
Location: Baltimore 2

Pre-Conference Workshop
Organizers
Ryan Summers, University of North Dakota, USA
Presenters
Ryan Summers, University of North Dakota, USA
Sahar Alameh, University of Kentucky, USA
Jeanne Brunner, University of Massachusetts Amherst, USA
Fouiad Abd-El-Khalick, University of Massachusetts Amherst, USA

Equity and Ethics Practices in Science Education: Implications for Teaching and Research

23-Mar-25, 8:00 AM-11:45 AM
Location: Magnolia 3

Pre-Conference Workshop
Organizer
Maria Rivera Maulucci, Barnard College, Columbia University, USA

Ways of Knowing Nature: Exploring Piscataway Park

23-Mar-25, 8:00 AM-11:45 AM
Location: Offsite

Pre-Conference Workshop
Organizers
Julie Robinson, University of North Dakota, USA
Steph Dean, Clemson University, USA
Julie Robinson, University of North Dakota, USA

Graduate Student Luncheon

23-Mar-25, 11:45 AM-12:45 PM
Location: Cherry Blossom Ballroom

Social Event

Presidential Welcome
23-Mar-25, 1:00 PM-1:15 PM
Location: Woodrow Wilson Ballroom

Keynote Panel: What Science Teachers Say to Researchers
23-Mar-25, 1:15 PM-2:15 PM
Location: Woodrow Wilson Ballroom

Keynote Panel
Organizer
Jerome Shaw, University of California, Santa Cruz, USA
Panelists
Denise Masayesva, Chasing Butterflies Consulting, USA
Hellin Pietikäinen, Hetta Primary School, Finland
Jonathan Perez, Mervyn Dymally High School, USA
Saeed Maigari,Prime Academy, Nigeria
YiWen Hung, The Affiliated Senior High School of National Taiwan Normal University, Taiwan

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Bridging Practice and Research: Perspectives on Achieving Stronger Mutual Impacts
23-Mar-25, 2:45 PM-4:15 PM
Location: Annapolis 4

Symposium
Organizers
Alexander Bohn, Northern Virginia Community College, USA
Karen Woodruff, Kean University, USA
Bryan Nichols, Florida Atlantic University, USA
Carrie-Anne Sherwood, Southern Connecticut State University, USA
Stephen Witzig, University of Massachusetts Dartmouth, USA
Beth Covitt, University of Montana, USA
Liam Guilfoyle, University of Oxford, United Kingdom
Mina Sedaghatjou, Rowan University, USA
James Nyachwaya, North Dakota State University, USA
Panelists
Rich DelVechio, Hackensack Public Schools, NJ, USA
Bridget Miller, University of South Carolina, USA
Deb Morrison, University of Washington, USA

Empowering Learners: Emotional Awareness, Self-Evaluation, and Cultural Influences in Education
Strand 1: Science Learning: Development of student understanding
23-Mar-25, 2:45 PM-4:15 PM
Location: Azalea 3

Stand-Alone Paper
Teachers as Sponsors: Empowering Urban Youth for Success through Advanced Placement Enrollment.
Justina Ogodo*, Baylor University, USA

Stand-Alone Paper
Engaging Emotions: Fostering Critical Emotional Awareness in Climate Justice Education
Michael Lawson*, Kansas State University, USA
Imogen Herrick*, University of Kansas, USA

Stand-Alone Paper

Further Reflections on the Influence of Culture on Development of Science Process Skills

Peter Okebukola*, Africa Centre of Excellence for Innovative and Transformative STEM Education, Lagos State University, Nigeria
Moses Emmanuel, Africa Centre of Excellence for Innovative and Transformative STEM Education, Lagos State University, Nigeria
Joshua Akinpelu, Africa Centre of Excellence for Innovative and Transformative STEM Education, Lagos State University, Nigeria
Abdulazeez Balogun, Africa Centre of Excellence for Innovative and Transformative STEM Education, Lagos State University, Nigeria
Atinuke Adekoya,Africa Centre of Excellence for Innovative and Transformative STEM Education, Lagos State University, Nigeria

Stand-Alone Paper

Investigating cross-age gender differences in accuracy of self-evaluation about introductory astronomy topics

Silvia Galano*, University Federico II, Italy
Italo Testa, University Federico II, Italy

Innovative Practices bridging Language, Identity, and Equity in STEM Education

Strand 2: Science Learning: Contexts, Characteristics and Interactions
23-Mar-25, 2:45 PM-4:15 PM
Location: Annapolis 1

Stand-Alone Paper

A Systematic Review of Research on Translanguaging in Science, Technology, Engineering and Mathematics Education

Kason Ka Ching Cheung*, The Education University of Hong Kong, Hong Kong
Davy Ng Tsz Kit, The University of Hong Kong, Hong Kong

Stand-Alone Paper

I think I'm going to be aningeniero: Translanguaging and engineering identity development

Kathryn Bateman*, Museum of Science, Boston, USA
Gregory Kelly*, University of Massachusetts, Amherst, USA
Peter Licona, Elizabethtown College, USA
Christine Cunningham, Museum of Science, Boston, USA

Stand-Alone Paper

Supporting Emergent Bilingual Students Understanding of Energy Through Equitable Teaching Practices

ANUPAM RAJ*, University of Massachusetts Dartmouth, USA
Shakhnoza Kayumova*, University of Massachusetts Dartmouth, USA

Exploring digitization in elementary science education

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies
23-Mar-25, 2:45 PM-4:15 PM
Location: Camellia 1

Stand-Alone Paper
Unveiling Young Students' Computational Thinking Strategies with Multiple Representations
Kristina Tank, Iowa State University, USA
Tamara Moore*, Purdue University, USA
Anne Ottenbreit-Leftwich, Indiana University, USA
Zarina Wafula, Iowa State University, USA
Sohheon Yang,Indiana University, USA
Lin Chu, Indiana University, USA

Stand-Alone Paper
AI Competencies for Elementary Students: A Comprehensive Literature Review and Implications for AI-integrated Science Education
Hui Yang*, SRI International, USA
Arif Rachmatullah*, SRI International, USA
Nonye Alozie, SRI International, USA
Yan-Ming Chiou, SRI International, USA

Stand-Alone Paper
Validating the App-Based Science and Engineering Practices Observation Protocol (SciEPOP) for Play-based Early Learning Environments
Alison Miller*, Bowdoin College, USA
Lauren Saenz, Bowdoin College, USA
Hildah Makori*, Bowdoin College, USA
Sadie Smith, Bowdoin College, USA
Lisa Kenyon,Maine Mathematics and Science Alliance, USA
Rachel Larimore, Samara Early Learning, USA
Maranda Chung, Maine Mathematics and Science Alliance, USA

Stand-Alone Paper
Enhancing Early Childhood Science and Engineering Practices through Professional Learning with the SciEPlay SEP Toolbox
Lisa Kenyon, Maine Mathematics and Science Alliance, USA
Rachel Larimore, Samara Early Learning, USA
Maranda Chung, Maine Mathematics and Science Alliance, USA
Hildah Makori*, Bowdoin College, USA
Alison Miller*,Bowdoin College, USA
Lauren Poniatowski,, Bowdoin College, USA
Sadie Smith, Bowdoin College, USA

Moving toward more dynamic and holistic approaches to assessing students in science education

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
23-Mar-25, 2:45 PM-4:15 PM
Location: Baltimore 4

Stand-Alone Paper
Rethinking Assessments in Science: A Teacher's Journey to Expand Accepted Knowledge and Ways of Knowing
Lindsay Wells*, University of Wisconsin - Madison, USA
Aaron Burg, Badger High School, USA
Ryan Stowe, University of Wisconsin - Madison, USA

Stand-Alone Paper
Alternative Assessment in High School Chemistry Exploring Teachers' Knowledge and Perceptions
Shirly Avargil*, Technion, Israel
Karen Sokolov, Bar Ilan University, Israel

Stand-Alone Paper
Teacher Use of 3D Assessments to Assess Student Learning and Provide Feedback
Jonathan Bowers*, Michigan State University, USA
Peng He, Washington State University, USA

Undergraduate Research: Challenges, Benefits, and Learning Outcomes

Strand 5: College Science Teaching and Learning (Grades 13-20)
23-Mar-25, 2:45 PM-4:15 PM
Location: Magnolia 3

Stand-Alone Paper
What are the Benefits and Challenges of Undergraduate Research? Perspectives from Undergraduate Students
Hayden Criswell*, University of Oklahoma, USA
Jacob Pleasants, University of Oklahoma, USA

Stand-Alone Paper
Using Course-based Undergraduate Research to Expand Student Understanding of Quantum Phenomena in Biological Chemistry
Joi Walker*, East Carolina University, USA
Clark Andersen, East Carolina University, USA
Evan Brinkley, East Carolina University, USA
Adam Offenbacher, East Carolina University, USA

Stand-Alone Paper
Experimental design skill may transfer to a scientific literacy skill in undergraduate introductory biology
Scott Kreher*, Dominican University, USA
Christopher Anderson, Dominican University, USA
Carissa Buber, Dominican University, USA
James Cerven, Dominican University, USA

Stand-Alone Paper
Exploring socially mediated metacognition in small group discussions during undergraduate biology laboratory courses
Asghar Gill, University of Nebraska Lincoln, USA
Lyrica Lucas, University of Nebraska Lincoln, USA
Jenny Dauer, University of Nebraska Lincoln, USA
Tomas Helikar, University of Nebraska Lincoln, USA
Joseph Dauer,University of Nebraska Lincoln, USA

Innovative Approaches in Informal Science Education

Strand 6: Science Learning in Informal Contexts
23-Mar-25, 2:45 PM-4:15 PM
Location: Magnolia 1

Stand-Alone Paper

Middle School Youths Identity Play as Investigators, Futurists, and Advocates During Critical Place-Based Learning

Heidi Carlone*, Vanderbilt University, USA
Hannah Ziegler, Vanderbilt University, USA
Tessaly Jen, Vanderbilt University, USA
Jingyi Chen, Vanderbilt University, USA
Zachary Conley,Vanderbilt University, USA
Alison Mercier, University of Wyoming, USA

Stand-Alone Paper

Making sense of a science-related poem by means of visual representations

Wilmo Francisco Junior*, Universidade Federal de Alagoas, Brazil
Miyuki Yamashita, Universidade Federal de Alagoas, Brazil

Stand-Alone Paper

Science in Third Spaces: Exploring Community Motivations at Informal Brewery Events

Jill Zipperer*, Texas State University, USA
Carolyn Jess, Texas State University, USA
Carrie Bucklin, Texas State University, USA
Kristy Daniel, Texas State University, USA

Exploring AI in Teacher Education

Strand 7: Pre-service Science Teacher Education
23-Mar-25, 2:45 PM-4:15 PM
Location: Baltimore 1

Stand-Alone Paper

Pre-service Teachers' Interactions with an Artificial Intelligence Agent during Theory Testing on Diffusion

Marios Papaevripidou*, University of Cyprus, Cyprus
Yvoni Pavlou, University of Cyprus, Cyprus
Theodoros Karafyllidis, University of Cyprus, Cyprus
Zacharias Zacharia, University of Cyprus, Cyprus
Tamar Fuhrmann,eachers College, Columbia University, USA

Stand-Alone Paper

AI Readiness and Preservice Secondary Science Teachers

Adam Bennion*, Brigham Young University, USA

Stand-Alone Paper

Investigating Factors Contributing to Pre-service Teachers' Acceptance of Artificial Intelligence in Education

Shuchen Guo, Nanjing Normal University, China
Xiaoming Zhai, University of Georgia, USA

Stand-Alone Paper

Coding to Learn Science, Science to Learn Coding: Intersections Between Computational, Modeling and Data Practices

Cassia Fernandez, University of São Paulo, Brazil
Tamar Fuhrmann*, Teachers College, Columbia University, USA

Advancing Teacher Professional Development: Scaling, Communities, and Impact

Strand 8: In-service Science Teacher Education
23-Mar-25, 2:45 PM-4:15 PM
Location: Annapolis 3

Stand-Alone Paper
Supporting STEMM Professional Development through Explicit Community of Practice Opportunities
Matthew Blank*, Baylor College of Medicine, USA
Alana Newell, Baylor College of Medicine, USA
Nancy Moreno, Baylor College of Medicine, USA

Stand-Alone Paper
Effects of a Professional Development Program related to Scientific Reasoning on Teachers, Instruction and Students
Richard Sannert*, IPN - Leibniz Institute for Science and Mathematics Education, Germany
Verena Petermann, Justus Liebig University, Germany
Janet Carlson, Stanford University, USA
Jan van Driel, The University of Melbourne, Australia
Moritz Krell,IPN - Leibniz Institute for Science and Mathematics Education, Germany

Stand-Alone Paper
Exploring Barriers to Scaling an Effective Teacher Professional Learning Program
Chris Wilson*, BSCS Science Learning, USA
Taylor Joseph, American Institutes for Research, USA
Amy Belcastro, BSCS Science Learning, USA
Jody Bintz, BSCS Science Learning, USA
Jenine Cotton-Proby,BSCS Science Learning, USA
Cindy Gay, BSCS Science Learning, USA
Janna Mahfoud, BSCS Science Learning, USA
Guy Ollison, BSCS Science Learning, USA
Molly Stuhlsatz, BSCS Science, USA
Bo Zhu, American Institutes for Research, USA

Stand-Alone Paper
Resource Networks Development and Their Impact on Implementing Digital Innovation in Physics Classrooms
Jaika Hott*, IPN, Germany
Stefan Sorge, IPN, Germany
Knut Neumann, IPN, Germany

Reflective Practices in Science Education: Discourse, Feedback, and Professional Development

Strand 8: In-service Science Teacher Education
23-Mar-25, 2:45 PM-4:15 PM
Location: Annapolis 2

Stand-Alone Paper
Negotiating Physics Teachers' Interpretations of Inequitable Patterns in Classroom Data During Coaching Sessions
Linsey Brennan*, Michigan State University, USA
Sunghwan Byun, North Carolina State University, USA
Julie Christensen, Michigan State University, USA
Nickolaus Ortiz, Georgia State University, USA
Niral Shah,University of Washington, USA

Daniel Reinholz, San Diego State University, USA
David Stroupe, University of Utah, USA
Marcos Caballero, Michigan State University, USA

Stand-Alone Paper

Reflective or Directive? Analyzing High School Science Mentors Written Feedback Comments on Mentees Recorded Lessons

Lynn Huff*, North Carolina State University, USA
Soonhye Park, North Carolina State University, USA
Grace Carroll, North Carolina State University, USA
Laura Chalfant, North Carolina State University, USA
William Reynolds,North Carolina State University, USA
Scott Ragan, North Carolina State University, USA
Jason Painter, North Carolina State University, USA

Stand-Alone Paper

Facilitation strategies responding to emotional displays in PD discourse: Navigating social and learning goals

Dana Vedder Weiss*, Ben Gurion University of the Negev, Israel
Rotem Trachtenberg Maslaton, Ben Gurion University of the Negev, Israel
karin Tsarfati Shaulov, Ben Gurion University of the Negev, Israel

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Centering Equity in Science Curriculum and Pedagogy

Strand 10: Curriculum and Assessment
23-Mar-25, 2:45 PM-4:15 PM
Location: Magnolia 2

Stand-Alone Paper

Historically Relevant Science Pedagogy: Beyond Representation Moving Towards Critical Consciousness

Alexis Riley*, New York University - Steinhardt, USA

Stand-Alone Paper

Teachers' customization of curriculum: Professional learning to center equity in the customization process

Katherine McNeill*, Boston College, USA
Austin Moore, Boston College, USA
Maria Moreno Vera, Boston College, USA
Samuel Lee, California State University, Long Beach, USA
Renee Affolter,OpenSciEd, USA

Stand-Alone Paper

In-Service Science Teachers' Perceptions and Enactment of Equity from Employing Digitally-Delivered Educative Curriculum Materials

Rebecca Hite*, Texas Tech University, USA

Advocating for Gender Equity in Science Higher Education

Strand 11: Cultural, Social, and Gender Issues
23-Mar-25, 2:45 PM-4:15 PM
Location: Azalea 1

Stand-Alone Paper
Empowering Women in Physics: Exploring How Leadership, Mentorship, and Career Conceptualization Shape Undergraduates' Physics Identity
Laura Akesson*, George Mason University, USA
Jessica Rosenberg*, George Mason University, USA
Nancy Holincheck*, George Mason University, USA
Benjamin Dreyfus, George Mason University, USA
Rocio Quiroga-Velasquez,George Mason University, USA
Julia Lipman*, George Mason University, USA

Stand-Alone Paper
Care, relationality and conflict in a geoscience department
Sarah El Halwany*, Université de l'Ontario français, Canada
Maryam Taheri, University of Calgary, Canada
Jennifer Adams, University of Calgary, Canada

Stand-Alone Paper
"I'm gay and Latino, but I'm still a man": Experiences of non-tenure track science faculty
Katherine Doerr*, Malmö University, Sweden

Stand-Alone Paper
A Critical Examination of How Physics Professors Describe Women in Physics Using Feminist Standpoint Theory
Christy Metzger*, University of Delaware, USA

Stand-Alone Paper
Enhancing Professional Vision in Gender-Sensitive Physics Education: Predictors and Implications for Teacher Training
Sanja Atanasova*, University of Teacher Education St.Gallen, Switzerland
Nicolas Robin, University of Teacher Education St.Gallen, Switzerland
Dorothee Brovelli, University of Teacher Education Lucerne, Switzerland

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Exploring Critical Epistemologies in Science Education

Strand 11: Cultural, Social, and Gender Issues
23-Mar-25, 2:45 PM-4:15 PM
Location: Azalea 2

Stand-Alone Paper
Bioethics as a Racial Project: Positionality and Ethics in Science
Matthew Weinstein*, University of Washington-Tacoma, USA

Stand-Alone Paper
Responding to CRT and DEI Prohibitions with QuantCrit and "Post" Methods
Christopher Irwin*, Florida International University, USA

Stand-Alone Paper
Science Teacher Leaders' Grappling with the Role of Race in Science Content Knowledge Production
Althea Roy*, Clemson University, USA
Kristen Duncan, Clemson University, USA
Brooke Whitworth, Clemson University, USA
Julianne Wenner, Clemson University, USA

Stand-Alone Paper
Decolonizing Science Education Research and Practice: Introducing the Islamic Philosophical Perspective of Wasatiyyah
Zahra Hazari*, Florida International University, USA
Amal Ibourk, Florida State University, USA
Hulya Avci, Florida International University, USA
Shakhnoza Kayumova, University of Massachusetts Dartmouth, USA

AI and Future STEM Education
Strand 12: Technology for Teaching, Learning, and Research
23-Mar-25, 2:45 PM-4:15 PM
Location: Baltimore 5

Stand-Alone Paper
Bridging the Gap: Perceived vs. Actual Ethical Awareness in AI among Future Engineers and Scientists
Maya Usher, Technion - Israel Institute of Technology, Israel
Miri Barak*, Technion - Israel Institute of Technology, Israel

Stand-Alone Paper
How Should We Utilize AI for Science Learning? A Discussion Based on Systematic Review
Xinyu He*, university of georgia, USA
Emily Adah Miller, university of georgia, USA
Tingting Li, washington state university, USA

Stand-Alone Paper
Using Large Language Models to Analyze Students' Hands-on Responses and Support Teachers' Timely Instructional Decisions
Peng He*, Washington State University, USA

Stand-Alone Paper
Comparative Analysis of AI Chatbots' Impact on Scientific Inquiry and Misconceptions in Biochemistry
Rıdvan Elmas*, Afyon Kocatepe University, Turkey
Merve ADIGUZEL-ULUTAS, Gazi University, Turkey
Mehmet YILMAZ, Gazi University, Turkey

Nature of Science and Argumentation
Strand 13: History, Philosophy, Sociology, and Nature of Science
23-Mar-25, 2:45 PM-4:15 PM
Location: Baltimore 2

Stand-Alone Paper
Consistency of Nature of Science Conceptions and Argumentation Skills
Rola Khishfe*, American University of Beirut, Lebanon

Stand-Alone Paper
Designing Discussion Questions for Nature of Science Read-Alouds
Jeanne Brunner*, University of Massachusetts Amherst, USA

Stand-Alone Paper
Argument Driven Inquiry in Practice: Patterns and Variations in Teachers' Knowledge
Brendan Callahan*, Kennesaw State University, USA
Michael Dias, Kennesaw State University, USA

Education for Sustainable Development

Strand 14: Environmental Education and Sustainability
23-Mar-25, 2:45 PM-4:15 PM
Location: Baltimore 3

Stand-Alone Paper
Student Competences in Education for Sustainable Development: Are teachers on board?
Tuba Stouthart, Eindhoven University of Technology, Netherlands
Duru Bayram*, Eindhoven University of Technology, Netherlands
Jan van der Veen, Eindhoven University of Technology, Netherlands

Stand-Alone Paper
From attitudes to action: an integrated model for sustainability education
Tessa Baierl, University of Bayreuth, Germany
Juergen Paul, University of Bayreuth, Germany
Franz Bogner, University of Bayreuth, Germany

Reframing Science and Engineering: Teachers' Strategies for Indigenizing STEM Education

23-Mar-25, 4:30 PM-6:00 PM
Location: Annapolis 4

Administrative Session
Reframing Science and Engineering: Teachers' Strategies for Indigenizing STEM Education
Organizers
Julie Robinson, University of North Dakota, Grand Forks, USA
Pauline Chinn, University of Hawaii at Manoa, USA
Panelists
Lenora Crabtree, University of North Carolina Charlotte, USA
Woei Hung, University of North Dakota, Grand Forks, USA
Paichi Shein,National Sun Yat-sen University, Taiwan
Stacy Potes, University of Hawai'i at Mānoa, USA
Stephanie Erickson, University of Minnesota, USA
Bhaskar Upadhyay, University of Minnesota, USA
Dimitri Smirnoff, University of Minnesota, USA
Devin Cavero, University of California-Berkley, USA

Research on Creativity of Students in Integrated STEM Education: A Scoping Review

Strand 1: Science Learning: Development of student understanding
23-Mar-25, 4:30 PM-6:00 PM
Location: Azalea 3

Stand-Alone Paper
How Might a STEM Integrated Curriculum Influence Students' Design Thinking?
Dina Thomason*, UTEP, USA
Pei-Ling Hsu, UTEP, USA

Stand-Alone Paper
Creativity in Science Education – A Scoping Review
Annette Upmeier zu Belzen*, Humboldt-Universität zu Berlin, Germany
Paul Engelschalt, Humboldt-Universität zu Berlin, Germany
Leroy Großmann, Freie Universität Berlin, Germany
Dirk Krüger*, Freie Universität Berlin, Germany

Stand-Alone Paper
Research on Creativity of Students in Integrated STEM Education: A Scoping Review
Shuaishuai Mi*, Faculty of Education, University of Macau, Macao
Xiufeng Liu, Faculty of Education, University of Macau, Macao

Stand-Alone Paper
Implementation of Engineering Design Process for Gifted Students: A Case of Science and Art Centers
Merve Adiguzel-Ulutas*, Gazi University, Turkey
Mehmet Yilmaz, Gazi University, Turkey

Centering Affect and Emotion Toward Justice and Dignity in Science Education

Strand 2: Science Learning: Contexts, Characteristics and Interactions
23-Mar-25, 4:30 PM-6:00 PM
Location: Annapolis 1

Related Paper Set
Affective politics of belonging to STEM
Sarah El Halwany*, Université de l'Ontario français, Canada
Jennifer Adams*, University of Calgary, Canada

Related Paper Set
Emotional Configurations of Whiteness in Learning to Teach Science in Anti-racist Ways
Jonathan McCausland*, Iona University, USA

Related Paper Set
"That's just gonna make them upset": Youth authoring emerging epistemic ideals through rightful presence
Rishi Krishnamoorthy*, University of Toronto, Canada
Ravit Golan Duncan, Rutgers University, USA
Edna Tan, University of North Carolina - Greensboro, USA

Related Paper Set
Elevating Configurations of Data and Emotion: Dynamics of Co-production and Competition
Kathryn Lanouette*, William & Mary, USA

Related Paper Set
'How do these data make you feel?": Emotional Pathways During Data Talks about Climate Justice
Imogen Herrick*, University of Kansas, USA
Michael Lawson, Kansas State University, USA
Ananya Matewos, Wilder Foundation, USA

Navigating Argumentation and Evidence in Science Education

Strand 2: Science Learning: Contexts, Characteristics and Interactions
23-Mar-25, 4:30 PM-6:00 PM
Location: Magnolia 2

Stand-Alone Paper
Students Knowledge and Sources of Information for Viruses and Vaccines: A Mixed Methods Study
Madeline Stallard*, North Carolina State University, USA
M. Gail Jones, North Carolina State University, USA
Julianna Nieuwsma, North Carolina State University, USA
Kathleen Bordewieck, North Carolina State University, USA
Tanzimul Ferdous,North Carolina State University, USA
Amber Meeks, North Carolina State University, USA

Stand-Alone Paper
Relationships Between Middle School Students' Epistemological Beliefs and Argumentation Quality in Genetically Modified Organisms
Burcu Bostancı*, Middle East Technical University, Turkey
Özgül Yılmaz-Tüzün, Middle East Technical University, Turkey

Stand-Alone Paper
Artificial Intelligence in Science Education Research: A systematic Review of NARST 2024
Gyeong-Geon Lee*, National Institute of Education, Singapore
Minji Yun*, University of Florida, USA
Xiaoming Zhai, University of Georgia, USA
Kent Crippen, University of Florida, USA

Stand-Alone Paper
Middle School Students' Use of and Rhetorical References to Inscriptions in Genetically Modified Organisms
Özgül Yılmaz-Tüzün*, Middle East Technical University, Turkey
Burcu Bostancı, Middle East Technical University, Turkey

Exploring strategies to enhance student engagement and learning outcomes across educational contexts

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
23-Mar-25, 4:30 PM-6:00 PM
Location: Baltimore 4

Stand-Alone Paper
The Paradox of Project-based Learning in Chinese Science Education Reformation
Jiaojiao Hui*, The University of Hong Kong, China
Jiaxin Chen*, The University of Hong Kong, China
Yongping Shao, Hangzhou Yinhu Experimental Middle School, China

Chen Chen, The University of Hong Kong, China

Stand-Alone Paper

Model-Based Inquiry: Designing for Opportunities to Learn

Ron Gray*, Northern Arizona University, USA
Todd Campbell*, University of Connecticut, USA
Yue Bai*, University of Connecticut, USA

Stand-Alone Paper

From Anxiety to Confidence: Unlocking the Potential of CTCA in ICT Education

Chinyere Ikpah, Lagos State University-Africa Centre of Excellence for Innovative and Transformative STEM Education, Nigeria
Peter Okebukola*, Lagos State University-Africa Centre of Excellence for Innovative and Transformative STEM Education, Nigeria
Rahman Alade, Lagos State University-Africa Centre of Excellence for Innovative and Transformative STEM Education, Nigeria
Rasheed Sanni, Lagos State University-Africa Centre of Excellence for Innovative and Transformative STEM Education, Nigeria
Deborah Agbanimu,National Open University of Nigeria, Nigeria

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Problem-Solving and Engagement in Undergraduate Physics Education

Strand 5: College Science Teaching and Learning (Grades 13-20)
23-Mar-25, 4:30 PM-6:00 PM
Location: Magnolia 3

Stand-Alone Paper

Changes in physics freshmens prior knowledge A comparison of the German 2013 and 2023 cohort

Dennys Gahrmann*, Physics Education, Institute of Physics and Astronomy, University of Potsdam, Germany
Irene Neumann, Leibniz Institute of Science and Mathematics Education (IPN), Germany
Andreas Borowski, Physics Education, Institute of Physics and Astronomy, University of Potsdam, Germany

Stand-Alone Paper

How Students Use Knowledge Resources to Solve Problems in a Problem-Solving First Lesson

Cheng-Wen He*, University of Georgia, USA
Logan Fiorella, University of Georgia, USA
Paula Lemons, University of Georgia, USA

Stand-Alone Paper

Exploring Student Success In Undergraduate Physics Using A Hybrid Of Problem-Solving and Retrieval Practice Prompts

Carina Rebello*, Toronto Metropolitan University, Canada
Winter Allen, Purdue University, USA
Mina Megally, Toronto Metropolitan University, Canada
Atish Kabiraj, Toronto Metropolitan University, Canada

Stand-Alone Paper
Comparing engagement and cognitive load between game-based, inquiry-based, and design-based labs in introductory undergraduate physics
Razan (Rosie) Hamed*, Purdue University, USA
N. Sanjay Rebello, Purdue University, USA

Family and Community Pathways to STEM Learning

Strand 6: Science Learning in Informal Contexts
23-Mar-25, 4:30 PM-6:00 PM
Location: Magnolia 1

Stand-Alone Paper
Comparing Three Models of Family STEM Conversations for Broadening STEM Participation
Cory Buxton*, Oregon State University, USA
Diana Crespo-Camacho*, Oregon State University, USA
Barbara Ettenauer, Oregon State University, USA

Stand-Alone Paper
Parents' Noticing of Opportunities to Trigger and Foster Science Interest in Everyday Life
Irit Vivante*, Ben-Gurion University, Israel
Dana Vedder-Weiss*, Ben-Gurion University, Israel

Stand-Alone Paper
Exploring the effects of parent-child inquiry-based co-learning on children's scientific interest and self-efficacy
Zuway-R Hong*, Chung Shan Medical University, Taiwan
Li-ting Cheng, National Dong Hwa University, Taiwan
Huann-shyang Lin*, National Sun Yat-sen University, Taiwan
Ing-jer Huang, National Sun Yat-sen University, Taiwan
Thomas Smith,Northern Illinois University, USA

Stand-Alone Paper
Gaining insight into Rural, Underserved Students Experiences of an At-home, Justice-Centered STEM Curriculum
Margaret Blanchard*, North Carolina State University, USA
Karen Collier*, Augusta University, USA
Ana-Maria Topliceanu*, North Carolina State University, USA

Approaches to enhance STEM teaching

Strand 7: Pre-service Science Teacher Education
23-Mar-25, 4:30 PM-6:00 PM
Location: Baltimore 1

Stand-Alone Paper
The Impact of Field Placements on Pre-Service Teachers' Self-Efficacy Related to Teaching STEM: A Review
Lillian Bentley*, Georgia State University, USA
Xin Xia, University of Virginia, USA
Robert Tai, Australia Catholic university, Australia
Xitao Fan, The Chinese university of hing Kong, China

Stand-Alone Paper

Pre-Service Science and Mathematics Teachers' Perceptions of STEM Education: Towards a STEM Teacher Education Framework

Hopegay Williams*, The University of the West Indies, Mona, Jamaica
Sharon Bramwell-Lalor, The University of the West Indies, Mona, Jamaica
Aldrin Sweeney, Ross University School of Medicine, Barbados

Stand-Alone Paper

Does grouping influence STEM and non-STEM major pre-service teachers' acquiring STEM teaching competence

Hsiao-Lin Tuan*, National Changhua University of Education, Taiwan
Chi-Chin Chin, National Taichung University of Education, Taiwan
Li-Yu Huang, National Changhua University of Education, Taiwan
Fen-Mei Chou, Changhua CityTeacher Center, Taiwan
Chien-Ying Chou,National Changhua University of Education, Taiwan

Stand-Alone Paper

Cognitive Aspect of Collaborative Problem-Solving Skills of Pre-Service Science Teachers Through STEM Activities

Ayşe Şatgeldi*, Middle East Technical University, Turkey
Ömer Özdemir, Middle East Technical University, Turkey
Ufuk Yıldırım, Middle East Technical University, Turkey

Examining Science Teacher Efficacy, Beliefs, and Inclusivity

Strand 8: In-service Science Teacher Education
23-Mar-25, 4:30 PM-6:00 PM
Location: Annapolis 3

Stand-Alone Paper

Investigating Elementary Teachers' Self-Efficacy in Science and Engineering Throughout a Year-Long Online Professional Learning Program

Ryan Summers*, University of North Dakota, USA
Rebekah Hammack, Purdue University, USA
Ashley Iveland, WestEd, USA
Meghan Macias, WestEd, USA
John Galisky,WestEd, USA
Michael Herbert, University of North Dakota, USA

Stand-Alone Paper

Exploring Secondary Science Teachers' Motivations, Goals, and Epistemological Beliefs in Reform-Oriented Professional Development Program

Khalid Alharbi*, North Carolina State University, USA
Soonhye Park*, North Carolina State University, USA
Grace Carroll*, North Carolina State University, USA
Laura Chalfant, North Carolina State University, USA
Elizabeth Kluckman,North Carolina State University, USA
William Reynolds, North Carolina State University, USA
Scott Ragan, North Carolina State University, USA
Jason Painter, North Carolina State University, USA

Stand-Alone Paper

Participant Perceptions About the Value of a Professional Development Program for Biology Teachers from Mexico

Gonzalo Peñaloza*, Centro de Investigació y de Estudios Avanzados del IPN, Unidad Monterrey, Mexico
María Guerra Ramos, Centro de Investigació y de Estudios Avanzados del IPN, Unidad Monterrey, Mexico
Zulmarie Pérez Horta, Science and Educational Media Group, Howard Hughes Medical Institute, USA
Javier Robalino, Science and Educational Media Group, Howard Hughes Medical Institute, USA
Tatiana Salazar López,Centro de Investigació y de Estudios Avanzados del IPN, Unidad Monterrey, Mexico
Irwing Vásquez Cerqueda, Centro de Investigació y de Estudios Avanzados del IPN, Unidad Monterrey, Mexico

Stand-Alone Paper

Impact of Gender and Sexual Diversity-Inclusive Professional Development on Rural Science Teachers' Attitudes and Beliefs

Gary Wright*, University of Missouri, USA
Austin Gaskin, University of Missouri, USA

Exploring Methodologies in Education Research: Insights and Applications from Early Career Scholars

Strand 10: Curriculum and Assessment
23-Mar-25, 4:30 PM-6:00 PM
Location: Annapolis 2

Symposium

Exploring Methodologies in Education Research: Insights and Applications from Early Career Scholars

Evelyn Boyd*, University of Mississippi, USA
Elizabeth Vaughan*, Reed College, USA
Katherine Doerr, Malmö University, Sweden
Emine Topalcengiz, University of Arkansas, USA
Jonathan Barcelo,Saint Louis University, Philippines

Advancing Multilingualism in Science Education

Strand 11: Cultural, Social, and Gender Issues
23-Mar-25, 4:30 PM-6:00 PM
Location: Azalea 1

Stand-Alone Paper

Creating a third space for multilingual learners through intertextuality: How are science textbooks faring?

Sara Salloum*, Ohio University, USA
Rana Baddour, American University of Beirut, Lebanon
Saouma BouJaoude, American University of Beirut, Lebanon

Stand-Alone Paper

Shifts towards heteroglossic ideologies and pedagogical translanguaging

through researcher-practitioner collaborative design of middle-school science curricula
Haemin Kim*, University of Houston, USA
Zhenjie Hou, University of Houston, USA
Araceli Enriquez-Andrade*, University of Houston, USA
Jie Zhang, University of Houston, USA
Mimi Lee,University of Houston, USA
Hien Tran, University of Houston, USA
Sissy Wong, University of Houston, USA
May JadAllah, University of Houston, USA

Stand-Alone Paper
Multilingual College Students Blending Linguistic Experimentation with Science Learning
Margaret Jeong, University of Illinois Chicago, USA
Adeesha Jayathilaka, University of Illinois Chicago, USA
Minjung Ryu, University of Illinois Chicago, USA

Creating a rightful presence for LGBTQ+ people in STEM

Strand 11: Cultural, Social, and Gender Issues
23-Mar-25, 4:30 PM-6:00 PM
Location: Azalea 2

Related Paper Set
Social Supports for Nonbinary Scientists: An Autoethnography on a Transdisciplinary Collaboration in LGBTQ-Inclusive STEM Scholarship
Ezra Kottler*, University of the Pacific, USA
Adrian Gentry, Purdue University, USA
Emily Haluschak*, Purdue University, USA
K. "Ren" Mendoza*, University of Nebraska at Omaha, USA
Riley DeHority,Virginia Tech, USA
Parker Lund, University of British Columbia, Canada
Miriam Backens, University of Lorraine, France

Related Paper Set
Spilling tea and kikis: Counternarrative explorations of a high school biology teacher
Khanh Tran*, Purdue University, USA

Related Paper Set
Queering the Scientific Method: How Rosalind Franklin's DNA Work "Reveals" the Queer Nature of Inquiry
Alexander Paulchell*, University of Arizona, USA
Kristin Gunckel, University of Arizona, USA

Related Paper Set
Designing effective LGBTQ inclusive science curricula and assessing pseudoscientific anti-LGBTQ bias in students
Charlie Blake*, Southern Illinois University Edwardsville, USA

Related Paper Set
Imagining Queer Past, Present, and Future Selves in STEM through Manga
Lisa Lundgren*, Utah State University, USA
Mario Suárez, Utah State University, USA
Colby Tofel-Grehl, Utah State University, USA

AI in Education Evaluation and Feedback

Strand 12: Technology for Teaching, Learning, and Research
23-Mar-25, 4:30 PM-6:00 PM
Location: Baltimore 5

Stand-Alone Paper
Multilingual Automated Scoring: Enhancing Equity in Science Education with NLP-SCR Across Polysemous Languages
Van Ngo*, Graduate Institute of Science Education, National Taiwan Normal University, Taiwan
John Lin, Graduate Institute of Science Education, National Taiwan Normal University, Taiwan
Chun-Yen Chang, Graduate Institute of Science Education, National Taiwan Normal University, Taiwan

Stand-Alone Paper
Cognitive synergy of human intelligence and artificial intelligence in designing equitable science assessments
Tingting Li*, Washington State University, USA

Stand-Alone Paper
Knowing Lecturer through Cyber-Security Students' Eyes, an Insights for Teaching Success with Machine Learning Algorithms
Michael Adewusi*, Kampala Internation University, Uganda
Ola Odekeye, Osun State University, Nigeria
Adeshina Adebanjo, Lagos State University, Nigeria

Stand-Alone Paper
Integrating Open-Source LLMs for Automatic Feedback into Physics Classes
André Meyer*, Leibniz University Hannover - Physics Education Group, Germany
Tom Bleckmann, Leibniz University Hannover - Physics Education Group, Germany
Gunnar Friege, Leibniz University Hannover - Physics Education Group, Germany

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Uncertainty, Perspective Taking and Reasoning in Science

Strand 13: History, Philosophy, Sociology, and Nature of Science
23-Mar-25, 4:30 PM-6:00 PM
Location: Baltimore 2

Stand-Alone Paper
Towards an Integrative Framework on Uncertainty in Science Teaching
Simon Blauza*, University of Münster, Centre for Biology Education, Germany
Kerstin Kremer, Justus Liebig University, Institute for Biology Education, Germany
Benedikt Heuckmann, University of Münster, Centre for Biology Education, Germany

Stand-Alone Paper
Dealing with Uncertainty in Science Education: A Systematic Review
Isa Korfmacher*, University of Münster, Centre for Biology Education, Germany
Christiane Konnemann, University of Münster, Centre for Biology Education, Germany
Marcus Hammann, University of Münster, Centre for Biology Education, Germany

Stand-Alone Paper
Suffering as a lens through which to motivate socioscientific perspective taking
David Owens*, University of Montana, USA
Robert Warner, University of Utah, USA
Mark Newton, East Carolina University, USA

Stand-Alone Paper
Futures Reasoning for Science Education
Senay Purzer*, Purdue University, USA
Duru Bayram*, Eindhoven University of Technology, Netherlands
Nazan Bautista*, Miami University, USA

Climate Change

Strand 14: Environmental Education and Sustainability
23-Mar-25, 4:30 PM-6:00 PM
Location: Baltimore 3

Stand-Alone Paper
New Jersey Elementary Teachers' Professional Learning about Climate Change
Lauren Madden*, The College of New Jersey, USA

Stand-Alone Paper
Teachers' Perceptions of Climate Science Uncertainty and Concerns about Implementing Climate Change Education
Ren-Ping Li*, Graduate Institute of Science Education, National Taiwan Normal University, Taiwan
Shiang-Yao Liu, Graduate Institute of Science Education, National Taiwan Normal University, Taiwan

Stand-Alone Paper
Fostering Agency and Decision-Making in Dealing With Climate Change: A Three-Lenses Approach
Giulia Tasquier*, ALMA MATER STUDIORUM - University of Bologna, Italy
Francesca Pongiglione, Vita-Salute S. Raffaele University, Italy
Elena Ricci, University of Verona, Italy

Stand-Alone Paper
Beyond their carbon footprints: Secondary school students' hope and action in face of climate change
Veronika Winter, University of Vienna, Austria
Miloslav Kolenatý, J. E. Purkyně University, Czech Republic
Jan Činčera, Masaryk university, Czech Republic
Andrea Möller*, University of Vienna, Austria

Supporting Policy Infrastructure in Computer Science and Engineering

Strand 15: Policy, Reform, and Program Evaluation
23-Mar-25, 4:30 PM-6:00 PM
Location: Camellia 1

Stand-Alone Paper
Working Across Boundaries: Examining the Computer Science Education Social Networks Within States
Stefanie Marshall*, Michigan State University, USA
Ain Grooms, University of Wisconsin, USA
Joshua Childs, University of Texas, USA

SJ Hemmerich*, University of Wisconsin, USA
Grace Tukurah*,Michigan State University, USA

Stand-Alone Paper
Inventing the Inventor: Identifying the capacities needed to be an inventive problem solver.
Adam Maltese, Indiana University, USA
Lauren Penney, Indiana University, USA
Kelli Paul*, Indiana University, USA
Peter Wardrip, University of Wisconsin, USA
Joanna Garner,Old Dominion University, USA

Stand-Alone Paper
Engineering Undergraduate Students' and Engineers' Career Choice and Retention with Focus on the Gender Aspect
Yehudit Dori*, Technion—Israel Institute of Technology, Israel
Hagit Refaeli-Mishkin, Technion—Israel Institute of Technology, Israel
Niva Wengrowicz, Technion—Israel Institute of Technology, Israel
Shahaf Rocker Yoel, Technion—Israel Institute of Technology, Israel
Dov Dori,Technion—Israel Institute of Technology, Israel

Mentor-Mentee Nexus
23-Mar-25, 6:00 PM-7:00 PM
Location: Annapolis 1

Social Event

President's Welcome Reception & Dance
23-Mar-25, 7:00 PM-10:00 PM
Location: Woodrow Wilson Ballroom

Social Event

In-Person Conference
24 March 2025

RIG Business Meetings
24-Mar-25, 7:00 AM-8:00 AM

Latino/a RIG (LARIG) Business Meeting
Location: Annapolis 1

Contemporary Methods for Science Education Research Business Meeting
Location: Annapolis 2

Engineering Education RIG (ENE-RIG) Business Meeting
Location: Annapolis 3

Indigenous Science Knowledge Research Interest Group (ISK-RIG) Business Meeting
Location: Baltimore 1

Lesbian, Gay, Bisexual, Transgender, Queer, Plus Science Education Research Group (LGBTQ + RIG) Business Meeting
Location: Baltimore 2

Research in Artificial Intelligence-Involved Science Education (RAISE) Business Meeting
Location: Baltimore 3

Asian and Pacific Islander Science Education Research (APISER) Business Meeting
Location: Baltimore 4

Continental and Diasporic Africa in Science Education RIG (CADASE) Business Meeting
Location: Baltimore 5

Mind and Sole Fun Run
24-Mar-25, 7:00 AM-8:00 AM
Location: Offsite

Social Event

Early Career Faculty Forum
24-Mar-25, 7:00 AM-8:00 AM
Location: Magnolia 1

Administrative Session
Organizers
Joi Merritt, James Madison University, USA
Harleen Singh, California State University Stanislaus, USA

Fostering Inquiry in Southern African Schools

24-Mar-25, 8:15 AM-9:45 AM
Location: Camellia 1

Administrative Session
Organizers
Umesh Ramnarain, University of Johannesburg, South Africa
Joseph Krajcik, Michigan State University, East Lansing, USA
Panelists
Tebogo Moloi, University of Johannesburg, South Africa
Sechaba Koma, National University of Lesotho, Roma, Lesotho
Lereko Mohafa,National University of Lesotho, Roma, Lesotho
Katlego Leshabane, University of Johannesburg, South Africa
Nolutuando Mdlalose, University of Johannesburg, South Africa
Mafor Penn, University of Johannesburg, South Africa

Graduate Student Research Symposium

24-Mar-25, 8:15 AM-9:45 AM
Location: Cherry Blossom Ballroom

Administrative Session
Organizers
Savannah Graham Hayes, Space Center Houston, USA
Johan Tabora, University of Illinois at Chicago, USA
Mutiara Syifa, The Ohio State University, USA
Austin Jenkins, Purdue University, USA
Andrea Reeder, Middle Tennessee State University, USA
Brandin Conrath, Pennsylvania State University, USA
Alyssa Freeman, Middle Tennessee State University, USA
Sierra Morandi, Florida State University, USA
Cathy Cullicott, Arizona State University, USA
Allison Metcalf, Florida State University, USA

Research in Artificial Intelligence-involved Science Education: RAISE RIG Poster Session

24-Mar-25, 8:15 AM-9:45 AM
Location: Annapolis 2

Administrative Session
Organizers
Xiaoming Zhai, University of Georgia, USA
Kent Crippen, University of Florida, USA
Presenters
Van Hoang Ngo, Taiwan Normal University, Taiwan
John Lin, Taiwan Normal University, Taiwan
Chun-Yen Chang,Taiwan Normal University, Taiwan
Shuchen Guo, Nanjing Normal University, USA
Ehsan Latif, University of Georgia, USA
Jinnie Shin, University of Florida, USA
Richard Lamb, University of Georgia, USA
Gyeong-Geon Lee, National Institute of Education, Singapore

Making sense of the microcosm: Perspectives of educators and learners on immunobiology

Strand 1: Science Learning: Development of student understanding
24-Mar-25, 8:15 AM-9:45 AM
Location: Azalea 3

Related Paper Set
US childrens understanding of viral transmission
David Menendez*, University of California Santa Cruz, USA
Tania Dhaliwal, University of Chicago, USA
Danielle Labotka, University of michigan, USA
Susan Gelman, University of michigan, USA

Related Paper Set
Multilingual Students Use of Metaphors in the Context of Immunological Processes
Ronja Sowinski*, Leuphana University Lueneburg, Germany
Elisabeth Hofer, Leuphana University Lueneburg, Germany
Simone Abels, Leuphana University Lueneburg, Germany

Related Paper Set
Evil witches invading your house: How pre-service teachers use metaphors and anthropomorphisms to explain immunobiology
Isabell Adler*, Teacher University Bern, Switzerland
Jakub Sowula, Teacher University Bern, Switzerland
Trix Cacchione, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland
Sebastian Tempelmann, Teacher University Bern, Switzerland

Related Paper Set
Children's Questions and Teacher's Responses about COVID-19 in Türkiye and the US
David Menendez, University of California, Santa Cruz, USA
Ronja Sowinski, Leuphana University of Lüneburg, Germany
Isabell Adler, University of Teacher Education Bern, Switzerland
Anna-Clara Rönner, University West, Sweden
Graciela Trujillo Hernandez*, University of Rochester, USA

Related Paper Set
Teaching infectious diseases at middle schools during and in the aftermath of the COVID-19 pandemic
Anna-Clara Roenner, Department of Environmental and Life Sciences, Sweden
Anna Jakobsson, Department of Educational Sciences, Individual and Society, Sweden
Niklas Gericke*, Department of Environmental and Life Sciences, Sweden

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Enhancing Science Teacher Knowledge and Practices

Strand 10: Curriculum and Assessment
24-Mar-25, 8:15 AM-9:45 AM
Location: Magnolia 1

Stand-Alone Paper
The Challenge of Competence in Primary and Lower Secondary Science Education – examples from Denmark
Jørgen Christiansen*, Department of Science Education, University of Copenhagen, Denmark

Stand-Alone Paper
Exploring Chemistry Teachers' Professional Knowledge and Noticing Through the Experience in a Chemistry-based Escape Room
Abir Saleh*, Technion – Israel Institute of Technology, Israel
Shirly Avargil, Technion – Israel Institute of Technology, Israel

Stand-Alone Paper
Intellectual humility and other content transcendent goals for science education
Jonathan Osborne*, Stanford University, USA
Daniel Pimentel*, University of Alabama, USA

Stand-Alone Paper
Examining Students' Scientific Inquiry Patterns Using Sequential Process Data
Yizhu Gao*, University of Georgia, USA
Xiaoming Zhai, University of Georgia, USA
Hee-Sun Lee, The Concord Consortium, USA

Stand-Alone Paper
A Mixed-Methods Investigation of Elementary/Middle School Science Teachers' Curriculum Use and Perceptions of Effectiveness
Tina Vo*, University of Nevada, Las Vegas, USA
Mayra Marquez-Mendez, University of Nevada, Las Vegas, USA
Adjoa Mensah, University of Nevada, Las Vegas, USA

Considering Context: Space and Place in Engineering Education

Strand 11: Cultural, Social, and Gender Issues
24-Mar-25, 8:15 AM-9:45 AM
Location: Azalea 1

Related Paper Set
Community-Based Engineering Learning in Familiar Contexts: Learning and Engineering Design Supported by Long-Term Relationships
Monica Cardella*, Florida International University, USA

Related Paper Set
Enacting Critical Science and Engineering Agency in a Community Focused Climate-Tech Journalism Project
Fatima Rahman*, Tufts University, USA
Kristen Wendell, Tufts University, USA
Chelsea Andrews, Tufts University, USA
Clara Mabour, Tufts University, USA
Greses Pérez,Tufts University, USA

Related Paper Set
Principles for Designing Culturally Sustaining Hip Hop STEM-rich Learning Spaces
Brian Gravel*, Tufts University, USA
Dionne Champion, TERC, USA
Eli Tucker-Raymond, Boston University, USA
Amon Millner, Olin College of Engineering, USA
Christopher Wright,Drexel University, USA
Ayana Allen-Handy, Drexel University, USA
Clara Mabour, Tufts University, USA

Related Paper Set
The Zone of Transition: Language as mediator of Space and Place in Engineering Education
Greses Perez, Tufts University, USA
G.R. Marvez, Tufts University, USA
Clara Mabour, Tufts University, USA
Ymbar Polanco Pino, Tufts University, USA

National Academies of Sciences, Engineering, and Medicine Consensus Study: Equity in K-12

24-Mar-25, 8:15 AM-9:45 AM
Location: Azalea 2

Symposium
Organizers
Kenne Dibner, NASEM Board on Science Education, Washington, DC, USA
Leticia Garcilazo Green, NASEM Board on Science Education, Washington, DC, USA
Eileen Parsons, University of North Carolina at Chapel Hill, USA
Panelists
Kenne Dibner, NASEM Board on Science Education, Washington, DC, USA
Eileen Parsons,University of North Carolina at Chapel Hill, USA
Stefanie Marshall, Michigan State University, East Lansing, USA
William Penuel, University of Colorado Boulder, USA

Innovative STEM Instruction

Strand 12: Technology for Teaching, Learning, and Research
24-Mar-25, 8:15 AM-9:45 AM
Location: Baltimore 5

Stand-Alone Paper
In-Field and Out-of-Field Teachers' Integration of a MOOC into their Instruction
Asnat Zohar*, Technion - Israel Institute of Technology, Israel
Shulamit Kapon, Technion - Israel Institute of Technology, Israel

Stand-Alone Paper
Lessons Learned from a Research-Practice Partnership to Integrate Agent-based Modeling into High School Science Classrooms
Aditi Wagh*, Massachusetts Institute of Technology, USA
Margaret Harrison, District of Columbia Public Schools, USA
Daniel Wendel, Massachusetts Institute of Technology, USA
Luke Conlin, Salem State University, USA
Emma Anderson,Massachusetts Institute of Technology, USA
Ilana Schoenfeld, Massachusetts Institute of Technology, USA

Stand-Alone Paper
The Effect Of Flipped Learning On Sixth Grade Students' Digital Literacy And Scientific Epistemological Beliefs
Feride Gökdaş*, Muğla Sıtkı Koçman University, Turkey
Aylin Çam, Muğla Sıtkı Koçman University, Turkey

Stand-Alone Paper

Lesson planning with ChatGPT for inquiry-based biology education – A(I) roll of the dice?

Leroy Grossmann*, Freie Universitaet Berlin, Germany
Maren Koberstein-Schwarz, IPN – Leibniz Institute for Science and Mathematics Education, Germany
Moritz Krell, IPN – Leibniz Institute for Science and Mathematics Education, Germany
Dirk Krueger, Freie Universitaet Berlin, Germany

Nature of Science and Socioscientific Issues in Biology and Undergraduate Settings

Strand 13: History, Philosophy, Sociology, and Nature of Science
24-Mar-25, 8:15 AM-9:45 AM
Location: Baltimore 2

Stand-Alone Paper

Reflections of Pre-Service Biology Teachers on the Nature of Science – What Does It Entail?

Sophie Kurschildgen*, Justus Liebig University, Germany
Alexander Büssing, Technische Universität Braunschweig/ Institute for Science Education, Germany
Stefan Schwarzer, University of Tübingen, Germany
Kerstin Kremer, Justus Liebig University, Germany

Stand-Alone Paper

On the construction and relation of science and sustainability in biology lessons

Charlotte Wolff*, University of Kassel, Germany
Helge Martens, University of Kassel, Germany

Stand-Alone Paper

Factors Associated with University Biology Students' Evolution Acceptance of and Emotive Receptivity Toward Learning Evolution

Benjamin Herman*, Texas A&M University, USA
Daniel DeJesus, Texas A&M University, USA
Aaron Kidd, University of Oklahoma, USA
Benjamin Janney, University of Utah, USA
Magda Villwock,Texas A&M University, USA
Carlos Perez, Texas A&M University, USA
Sarah Poor, University of Missouri, USA
Michael Clough, Texas A&M University, USA
Asha Rao, Texas A&M University, USA

Stand-Alone Paper

Exploring Factors Associated with Undergraduate Students' Engagement with Socioscientific Issues Mis/disinformation

Sarah Poor*, University of Missouri, USA
Benjamin Herman, Texas A&M University, USA

Climate Literacy 1

Strand 14: Environmental Education and Sustainability
24-Mar-25, 8:15 AM-9:45 AM
Location: Baltimore 3

Stand-Alone Paper

The Dark Corners of Southern Taiwan: An Investigation into the Ecological Identity and Littering Behavior

Jhu-Chun Yang*, Institute of Education, National Sun Yat-sen University,, Taiwan
Paichi Pat Shein, Institute of Education, National Sun Yat-sen University,, Taiwan

Stand-Alone Paper

'There have always been hot days'' – Analyzing high school students' argumentation from real-world climate data

Kay Burger*, Institut für Physik und Technische Bildung, Germany
Engin Kardaş, Institut für Physik und Technische Bildung, Germany
Tobias Ludwig, Institut für Physik und Technische Bildung, Germany

Stand-Alone Paper

What motivates citizens to engage in different scientific activities of Citizen Science projects?

Till Bruckermann*, Leibniz University Hannover, Germany
Denise Bock, IPN–Leibniz Institute for Science and Mathematics Education, Germany
Hannah Greving, Leibniz University Hannover, Germany
Anke Schumann, Leibniz Institute for Zoo and Wildlife Research, Germany
Milena Stillfried,Leibniz Institute for Zoo and Wildlife Research, Germany
Konstantin Börner, Leibniz Institute for Zoo and Wildlife Research, Germany
Robert Hagen, Landwirtschaftliches Zentrum Baden-Württemberg, Germany
Sophia Kimmig, Leibniz Institute of Freshwater Ecology and Inland Fisheries, Germany
Miriam Brandt, Leibniz Institute for Zoo and Wildlife Research, Germany
Ute Harms, IPN–Leibniz Institute for Science and Mathematics Education, Germany

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Roundtables 1

24-Mar-25, 8:15 AM-9:45 AM
Location: Woodrow Wilson Ballroom

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Roundtable

Investigating inquiry-based learning in inclusive science education

Leonie Willmes*, University Duisburg-Essen, Germany
Helena van Vorst, University Duisburg-Essen, Germany
Mathias Ropohl, University Duisburg-Essen, Germany

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Roundtable

Evaluating Pedagogical Design Capacities for Differentiated Instruction in a digital environment. A case study.

Stephanie Bismuth*, Weizmann Institute of Science, Israel
Yael Shwartz, Weizmann Institute of Science, Israel
Anat Yarden, Weizmann Institute of Science, Israel

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Roundtable
The Impact of Students' Participation in Scientific Experiments on Scientific Achievements
Chaochao Jia*, China Research Institute for Science Popularization, China
Xiuju Li, China Research Institute for Science Popularization, China
Yu Qian, College of Physics and Optoelectronics Technology, Baoji University of Arts and Science, China
Tao Yang, Collaborative Innovation Center of Assessment for Basic Education Quality, Beijing Normal University, China
Yue Zhang,Institute on Educational Policy and Evaluation of International Students, Beijing Language and Culture University, China

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Roundtable
Inclusive science education: Recognizing barriers and enabling participation via vignettes
Nathalie Beck*, University Duisburg-Essen, Germany
Mathias Ropohl, University Duisburg-Essen, Germany
Helena van Vorst, University Duisburg-Essen, Germany

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Roundtable
Education Needs Uncertainty: The Objective of Being in a Different Place
Leah Master*, NYU-Steinhardt, USA
Catherine Milne*, NYU-Steinhardt, USA
Anna Skorupa*, NYU-Steinhardt, USA
Shaghig Chaparian*, NYU-Steinhardt, USA
Kathryn Scantlebury,University of Delaware, USA

Strand 5: College Science Teaching and Learning (Grades 13-20)
Roundtable
From Expectations to Reality: Female Students' Experiences and Struggles in Introductory Physics
Liliana Garcia*, University of California, Santa Barbara, USA

Strand 5: College Science Teaching and Learning (Grades 13-20)
Roundtable
Supporting first-generation college students in the sciences: An exploration of transformative teaching in higher education
Lisa Marco-Bujosa*, Villanova University, USA
Gracie Petrelli, Villanova University, USA

Strand 5: College Science Teaching and Learning (Grades 13-20)
Roundtable
Engaging Faculty in Professional Development to Support Revisions to a Non-Majors' Environmental Science Course
Hannah Jardine*, American University, USA
Barbara Balestra, American University, USA
Dhananjaya Katju, American University, USA
Alicia DeBruin, American University, USA
Carolyn Parker*,American University, USA

Strand 6: Science Learning in Informal Contexts
Roundtable
Development and Application of the Scripted Animation Survey (SAS) for Afterschool Professional Development
Heidi Cian*, Maine Mathematics and Science Alliance, USA

Strand 6: Science Learning in Informal Contexts
Roundtable
Supporting Learners Through Emotional Anchors in an AI and Paleontology Curriculum: A Social Constructivist Perspective
Nazanin Adhami*, University of Florida, USA
Tonika Jones, University of Florida, USA
Ray Opoku, University of Florida, USA
Gabriella Haire, University of Florida, USA
Christine Wusylko,University of Florida, USA
Chih Hsuan Lin*, University of Florida, USA
Bruce MacFadden, University of Florida, USA
Victor Perez, St. Mary's College of Maryland, USA
Brian Abramowitz, University of Florida, USA
Pavlo Antonenko, University of Florida, USA

Strand 6: Science Learning in Informal Contexts
Roundtable
Use of tactile prompts to increase memory of scientific experiences
Rhea Miles*, East Carolina University, USA

Strand 6: Science Learning in Informal Contexts
WIP Roundtable
Reception by primary-school pupils and parents of comic strips launching inquiries at home or school
Estelle Blanquet*, INSPE de l'académie de Bordeaux, France

Strand 8: In-service Science Teacher Education
Roundtable
Teacher Disposition and Professional Development Outcomes: A Case Study of Physics Teachers.
Justina Ogodo*, Baylor University, USA

Strand 8: In-service Science Teacher Education
Roundtable
K-12 Teacher Motivations to Attend Climate Change Professional Development
Amber Meeks*, North Carolina State University, USA
M. Gail Jones*, North Carolina State University, USA
Rebecca Ward, North Carolina State University, USA
Kathleen Bordewieck, North Carolina State University, USA
Tanzimul Ferdous,North Carolina State University, USA
Madeline Stallard, North Carolina State University, USA

Strand 8: In-service Science Teacher Education
Roundtable
Implementing Phenomenon-Based Instruction in Secondary Science Classrooms: A Case Study of Science Teachers' Approaches

Ezgi Yesilyurt*, Weber State University, USA
Jennifer Claesgens, California State University, East Bay, USA

Strand 8: In-service Science Teacher Education
Roundtable
A Participatory Professional Development Workshop: Exploring Middle School Students and Teachers Reflections
Michael Cassidy, TERC, USA
Debra Bernstein, TERC, USA
Gillian Puttick, TERC, USA
Santiago Gasca, TERC, USA

Strand 8: In-service Science Teacher Education
Roundtable
Computational Classrooms: A Constructivist, Research-Based Approach to Designing a Computer Science Course for Teachers
Jonathan Rivera*, University of Maryland, USA
Jennifer Radoff, University of Maryland, USA

Strand 8: In-service Science Teacher Education
WIP Roundtable
'You're Scientists Because You're Doing Research'': How Teachers Take Up Doing ''Authentic'' Science With Students
Megan Walser*, Michigan State University, USA
David Stroupe*, University of Utah, USA

Strand 11: Cultural, Social, and Gender Issues
Roundtable
TRANSforming language use in science education through trans and queer studies
Ayça Fackler*, University of Missouri, USA
Gary Wright*, University of Missouri, USA

Strand 11: Cultural, Social, and Gender Issues
Roundtable
Embodied Inquiry: Intersecting Queer/Trans Self-Determination with the Nature of Science
K. "Ren" Mendoza*, University of Nebraska at Omaha, USA
Khanh Tran*, Purdue University, USA

Strand 11: Cultural, Social, and Gender Issues
Roundtable
Navigating the Margins: Self-Advocacy, Mentorship, and Institutional Barriers in the Careers of Nonbinary STEM Faculty
Ezra Kottler*, University of the Pacific, USA
K. "Ren" Mendoza*, University of Nebraska at Omaha, USA
Adrian Gentry, Purdue University, USA
Emily Haluschak*, Purdue University, USA

Strand 10: Curriculum and Assessment
WIP Roundtable
Centering Student Voice to Engage a Teacher's Critical Noticing to (w)Holistically Assess Student Thinking
Terrance Burgess, Michigan State University, USA

Strand 10: Curriculum and Assessment
WIP Roundtable
Exploring Core Ideas: A Systematic Literature Review of Core Ideas in Science Education
Helen Semilarski*, University of Tartu, Estonia
Helin Semilarski, University of Tartu, Estonia

Strand 10: Curriculum and Assessment
WIP Roundtable
Designing research-based STEM frameworks for student-focused holistic aquatic robotics kits (SHARK) for children and adolescents
Zoubeida Dagher*, University of Delaware, USA
Jennifer Gallo-Fox, University of Delaware, USA
Maisha Mouli, University of Delaware, USA
Faezeh Vahdat-Nia, University of Delaware, USA
Tyler Van Buren,University of Delaware, USA

WIP Roundtable
Fidelity of Implementation to Three-Dimensional Critical Components: A Systematic Review
Lauren Browning*, George Washington University, USA

Strand 14: Environmental Education and Sustainability
Roundtable
Problem-Based Learning in a Non-Majors Environmental Science Class. Is it Science?
Carolyn Parker*, American University, USA
Nicole LeVee, American University, USA
Hannah Jardine, American University, USA
Alicia Debruin, American University, USA

Strand 14: Environmental Education and Sustainability
WIP Roundtable
Assessing students' knowledge in the field of green chemistry
Laura Freude*, University of Duisburg-Essen, Germany
Mathias Ropohl, University of Duisburg-Essen, Germany

Strand 14: Environmental Education and Sustainability
WIP Roundtable
Systems thinking in chemistry education – modelingand test development
Silja Herholz*, University of Duisburg-Essen, Germany
Mathias Ropohl, University of Duisburg-Essen, Germany

Developing Scientific Attitudes and Identities

Strand 2: Science Learning: Contexts, Characteristics and Interactions
24-Mar-25, 8:15 AM-9:45 AM
Location: Annapolis 1

Stand-Alone Paper
Middle School Science Interest: Elementary School Science Experiences and Middle School Science and Mathematics Grades
Katherine Dabney*, Virginia Commonwealth University, USA
Gerhard Sonnert, Harvard, USA
Susan Sunbury, Harvard, USA
Philip Sadler, Harvard, USA

Stand-Alone Paper
Bridging the Attitude Gap: Trust in Science vs. Learning Science
Adi Moskovits*, Weizmann Institute of Science, Israel
David Fortus, Weizmann Institute of Science, Israel

Stand-Alone Paper
Reducing Chemophobia and Improving Chemistry Learning through an Amalgam of Culture-Technology-Context-and-Humor
Adekunle Oladejo, Lagos State University (LASU-ACEITSE), Nigeria
Peter Okebukola, Lagos State University (LASU-ACEITSE), Nigeria
Rasheed Sanni, Lagos State University (LASU-ACEITSE), Nigeria
Taibat Olateju, Obafemi Awolowo University, Nigeria
Franklin Onowugbeda, Lagos State University (LASU-ACEITSE), Nigeria
Deborah Agbanimu, National Open University of Nigeria (NOUN), Nigeria
Olasunkanmi Gbeleyi, Lagos State University (LASU-ACEITSE), Nigeria
Ademola Ibukunolu, Lagos State University (LASU-ACEITSE), Nigeria
Esther Peter, Lagos State University (LASU-ACEITSE), Nigeria

Stand-Alone Paper
Examining Science Identity Shifts: The Role of Peer and Teacher Positioning in Classroom Interactions
Wenya Yang, Ruixiang Experimental School, China
Weiwei He*, Michigan State University, USA
Huixian Wu, Institute of Problem-Systematized-Learning, China

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Examining science teacher identity, beliefs, and transformative practices to improve educational outcomes

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
24-Mar-25, 8:15 AM-9:45 AM
Location: Baltimore 4

Stand-Alone Paper
Science Teacher Identity Among National Board-Certified Science Teachers
Jennifer Tripp*, University at Buffalo, SUNY, USA
Xiufeng Liu, University at Buffalo, SUNY, USA

Stand-Alone Paper
Exploring science teachers' beliefs and practice patterns: a latent profile analysis
Zhao Cao Kan*, East China Normal University, China
Aik-Ling Tan, National Institute of Education, Nanyang Technological University, Singapore
Xinning Pei, East China Normal University, China

Stand-Alone Paper
Raciolinguistic ideologies and formative assessment among middle and high school science teachers: A preregistered replication
Quentin Sedlacek*, Southern Methodist University, USA
Maricela León, Southern Methodist University, USA
Nickolaus Ortiz, Georgia State University, USA
Catherine Lemmi, California State University Chico, USA

Kimberly Feldman,Southwest Academy, Baltimore County Public Schools, USA

Critical Thinking and Argumentation in STEM

Strand 5: College Science Teaching and Learning (Grades 13-20)
24-Mar-25, 8:15 AM-9:45 AM
Location: Magnolia 3

Stand-Alone Paper

Using Model Evidence Link Diagram to Assess College Students' Plausibility Perceptions on Climate Change

Gizem Ozyazici*, Syracuse University, USA
Gaye Ceyhan, Bogazici University, Turkey

Stand-Alone Paper

University Students Perceptions of a Newly Designed Instructional Framework for Promoting Critical Thinking

Carmella Shahab*, Technion - Israel Institute of Technology, Israel
Miri Barak, Technion - Israel Institute of Technology, Israel

Stand-Alone Paper

Assessing Student Scientific Argumentation Using Natural Language Processing

Winter Allen*, Department of Physics and Astronomy, Purdue University, USA
Carina Rebello, Department of Physics, Toronto Metropolitan University, Canada
N. Sanjay Rebello, Department of Physics and Astronomy, Purdue University, USA

Stand-Alone Paper

Designing Issue-based Instruction in General Education Course to Influence Undergraduates' Argumentation Performances and Learning Interest

Shih-Yeh Chen*, National Taichung University of Education, Taiwan
Shiang-Yao Liu, National Taiwan Normal University, Taiwan

Engaging High School Students through Research and Outreach Experiences

Strand 6: Science Learning in Informal Contexts
24-Mar-25, 8:15 AM-9:45 AM
Location: Magnolia 2

Stand-Alone Paper

A Qualitative Analysis of High School Students' Reflections Before and After a University Field Trip

Toluwalase Salako*, North Carolina State University, USA
Tyler Harper-Gampp, North Carolina State University, USA
Margaret Blanchard, North Carolina State University, USA

Stand-Alone Paper

Measuring High School Student Knowledge of Quantum Information Science and Technology in University-Based Outreach

Robert De La Cruz, Stony Brook University, USA
Angela Kelly, Stony Brook University, USA
Tzu-Chieh Wei, Stony Brook University, USA
Dominik Schneble, Stony Brook University, USA
Michele Darienzo,Stony Brook University, USA

Stand-Alone Paper
URM HIGH SCHOOL STUDENTS EXPERIENCES WITH AUTHENTIC RESEARCH CONDUCTED AT A UNIVERSITY CAMPUS
Maram Alaqra*, Sharjah Education Academy, UAE
Bugrahan Yalvac, Texas A&M University, USA

Stand-Alone Paper
Questioning to Facilitate Dialogues between Scientists and High School Students in A Science Internship
Pei-Ling Hsu*, University of Texas at El Paso, USA
Erica Nash*, University of Texas at El Paso, USA

Computational Thinking in STEM Teaching and Learning

Strand 7: Pre-service Science Teacher Education
24-Mar-25, 8:15 AM-9:45 AM
Location: Baltimore 1

Stand-Alone Paper
Pre-Service Teachers' Reasoning about the Nervous System
Ihsan Ghazal*, Boston University, USA
Hayat Hokayem, Texas Christian University, USA

Stand-Alone Paper
Challenging Misconceptions: Leveraging Cognitive Conflict to Enhance Pre-service Science Teachers' Understanding
Jingyun Wu*, Indiana University, USA
Adam Maltese, Indiana University, USA
Gholamreza Shamsi Pour Siahmazgi, Indiana University, USA
Arya Karumanthra, Indiana University, USA

Stand-Alone Paper
Empowering Science Pre-service Teachers: Computational Thinking Preparation though SPARC-infused instruction
Jianlan Wang*, Texas Tech University, USA
Yuanlin Zhang, Texas Tech University, USA

Stand-Alone Paper
Investigating Preservice Teachers' (PSTs') Conceptions of"Plugged" and "Unplugged" Computational Thinking (CT) via Integrated Robotics
Jeffrey Radloff*, SUNY Cortland, USA
Bridget Miller*, University of South Carolina, USA
Qwynne Lackey, SUNY Cortland, USA

Transformative Professional Development for Equitable STEM Education

Strand 8: In-service Science Teacher Education
24-Mar-25, 8:15 AM-9:45 AM
Location: Annapolis 3

Stand-Alone Paper
Shifts in middle school STEM teachers' conceptions of teacher leadership and equity
Matthew Wilsey*, University of Notre Dame, USA
Michael Szopiak, University of Notre Dame, USA
D'Anna Pynes, University of Notre Dame, USA

Catherine Wagner, University of Notre Dame, USA
Matthew Kloser*,University of Notre Dame, USA
Gina Svarovsky, University of Notre Dame, USA

Stand-Alone Paper
Middle-School STEM Teachers' Collaborative Sensemaking During a Curriculum Planning Workshop
Kristen Wendell*, Tufts University, USA
Geling Xu, Tufts University, USA
Debra Bernstein, TERC, USA
Michael Cassidy, TERC, USA
William Church,CRCS, USA
Ethan Danahy, Tufts University, USA

Stand-Alone Paper
(Un)Becoming-STEMM Educator-With Justice-Oriented Professional Development Workshops
Katherine Ayers*, St. Jude Children's Research Hospital, USA
Robyn Pennella, St. Jude Children's Research Hospital, USA
Olayinka Mohorn-Mintah, University of Memphis, USA

Stand-Alone Paper
Extending your Professional Development: Exploring Virtual PLCs as an opportunity for continued teacher support.
Austin Moore*, Boston College, USA
Maria Moreno Vera, Boston College, USA
Katherine McNeill, Boston College, USA

Bridging Theory and Practice: Modeling, Mathematization, and Student Development

Strand 1: Science Learning: Development of student understanding
24-Mar-25, 10:00 AM-11:30 AM
Location: Azalea 3

Stand-Alone Paper
Bridging Equations and Phenomena: Task Design's Role in Promoting Blended Sensemaking
Desi Desi, Sriwijaya University, Indonesia
Anita Schuchardt*, University of Minnesota, USA

Stand-Alone Paper
Evaluating Students' Development of Systems Thinking via Computational System Modeling
Emil Eidin*, University of Wyoming, USA
Jonathan Bowers, Michigan State University, USA
Mark Perkins, University of Wyoming, USA

Stand-Alone Paper
Challenges of Modeling Life Cycles for Lebanese Elementary Students
Christelle Fayad*, Texas Christian University, USA
Hayat Hokayem*, Texas Christian University, USA

Stand-Alone Paper
Leveraging Mathematization Process to Enhance Automated Scoring of Learning Progression Based Items
Hui Jin*, Georgia Southern University, USA
Cynthia Lima, University of Texas at San Antonio, USA

Investigating Strategies for Fostering Social-Emotional Growth in STEM

Strand 2: Science Learning: Contexts, Characteristics and Interactions
24-Mar-25, 10:00 AM-11:30 AM
Location: Annapolis 1

Stand-Alone Paper
Differentiated instruction as a method to influence cognitive and affective learning outcomes in chemistry education
Anna Liskes*, University of Duisburg-Essen, Germany
Helena van Vorst, University of Duisburg-Essen, Germany

Stand-Alone Paper
A Framework for Examining the Interconnectedness of STEM and SEL
Cory Susanne Miller*, Michigan State University, USA
Kathryn Bateman*, Museum of Science, USA

Stand-Alone Paper
Facilitating productive affective transitions during a physics inquiry
Lulu Garah*, Technion - Israel Institute of Technology, Israel
Shulamit Kapon, Technion - Israel Institute of Technology, Israel

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Enhancing strategies for boosting elementary student scientific literacy

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies
24-Mar-25, 10:00 AM-11:30 AM
Location: Camellia 1

Stand-Alone Paper
The Impact of Organizing and Addressing STEM-practices in a STEM-circle in 2ndgrade STEM leaning environments
Kara-Sophie Köhler*, University of Hamburg, Germany
Karl Wollmann, University of Leipzig, Germany
Annett Steinmann, University of Leipzig, Germany
Kim Lange-Schubert, University of Leipzig, Germany
Maike Hagena,Leibniz University of Hannover, Germany
Marcus Schütte, University of Hamburg, Germany
Mirjam Steffensky, University of Hamburg, Germany

Stand-Alone Paper
Understanding Discrepancies in Science Identity by Gender and Grade among Chinese Students
Bing Feng, Beijing Normal University, China
Yangdan Liu, Beijing Normal University, China
Jing Lin*, Beijing Normal University, China

Stand-Alone Paper
The Impact of Engineering DesignBased Instruction on Urban Elementary Students Nature of Engineering Views

Emine Sahin Topalcengiz*, Mus Alparslan University, Turkey

Stand-Alone Paper

Investigating Mechanistic Reasoning in Modeling-Based Learning in Kindergarten Science: The case of Melting And Freezing

Loucas Louca*, European University Cyprus, Cyprus
Maro Michaelidou, Ministry of Education and Culture, Cyprus

NARST Connects

24-Mar-25, 10:00 AM-11:30 AM
Location: Camellia 2

Discussion Session

This is a time for conference attendees to connect and discuss professionally related topics of their choosing. There are no designated presenters or moderators.

Examining the transformative potential of systems thinking, technology, and teacher agency in modern education

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
24-Mar-25, 10:00 AM-11:30 AM
Location: Baltimore 4

Stand-Alone Paper

Improving high school student's scientific competencies through systems thinking inquiry

Yu-Jan Tseng*, Institute of Professional Development for Educators, National Chung Hsing University, Taiwan
Huann-shyang Lin, Centre for General Education, National Sun Yat-sen University, Taiwan

Stand-Alone Paper

Enhancing Self-Regulated Problem Solving Through a Web-based Metacognitive Tool

Leonie Jasper*, TU Dortmund University, Germany
Insa Melle, TU Dortmund University, Germany

Stand-Alone Paper

The Alchemy of Teacher-Driven Adaptations in the Age of Digital Curricula

Brandin Conrath, Virginia Commonwealth University, USA
Scott McDonald, The Pennsylvania State University, USA

Stand-Alone Paper

Insights into Co-designing Teaching NGSS-aligned Computational Agent-based Modeling Units in High School Science Classrooms

Elroy Murray*, DCPS, USA
Aditi Wagh, MIT, USA
Luke Conlin, Salem State University, USA

Epistemic Practices, Beliefs, and Agency in STEM

Strand 5: College Science Teaching and Learning (Grades 13-20)
24-Mar-25, 10:00 AM-11:30 AM
Location: Magnolia 3

Stand-Alone Paper

Exploring effective strategies of developing student systems thinking and epistemic beliefs about science

Huann-shyang Lin*, National Sun Yat-sen University, Taiwan
Zuway-R Hong, Chung Shan Medical University, Taiwan
Hsin-Hui Wang, National Tsing Hua University, Taiwan
Ming-Yeng Lin, National Cheng Kung University, Taiwan

Stand-Alone Paper
EPIC-Quest: Characterizing Epistemic Messages in Chemistry Lectures
Nicole Graulich*, Justus-Liebig University Giessen, Institute of Chemistry Education, Germany
Elias Heinrich, Justus-Liebig University Giessen, Institute of Chemistry Education, Germany

Stand-Alone Paper
Scientific Writing in English in Higher Education and Non-Anglophone Students' Participation in Epistemic Practices
Luciana Milena*, Universidade Federal do ABC, Brazil
Danusa Munford, Universidade Federal do ABC, Brazil

Stand-Alone Paper
Biological reasoning and epistemic agency: A case of undergraduate biology teaching and learning
Greta Etherton*, University of Maryland, USA
Daniel Levin*, University of Maryland, USA
Julia Gouvea*, Tufts University, USA

Centering Equity, Agency, and Diverse Epistemologies in Informal STEM Education

Strand 6: Science Learning in Informal Contexts
24-Mar-25, 10:00 AM-11:30 AM
Location: Magnolia 2

Stand-Alone Paper
Negotiating Power: Minoritized youth instructors' enactments of critical agency in outreach activities in their community
Wisal Ganaiem*, Technion - Israel Institute of Technology, Israel
Fadia Nasser-Abu-Alhija, Tel Aviv University, Israel
Shulamit Kapon, Technion - Israel Institute of Technology, Israel

Stand-Alone Paper
STEM Outreach as Academic Imperialism: A Critical Discourse Analysis
george schafer*, Drexel University, USA

Understanding Preservice Teachers' Teaching and Learning practices

Strand 7: Pre-service Science Teacher Education
24-Mar-25, 10:00 AM-11:30 AM
Location: Baltimore 1

Stand-Alone Paper
Understanding Stress and Coping Strategies of Pre-Service Science Teachers in a Teacher Preparation Program
Anne Levendusky*, University of Florida, USA
Kent Crippen, University of Florida, USA

Stand-Alone Paper
Battling the Clock: P-2nd Clinical Educator Dilemmas Regarding Time for Science
Jennifer Gallo-Fox, University of Delaware, USA
Sothera Veng, University of Delaware, USA
Rosa Mykyta-Chomsky*, University of Delaware, USA

Stand-Alone Paper
Personal Characteristics Impacting Teachers' Effective Argumentation Teaching in science classrooms: A Literature Review
Nannan Fan*, University of north carolina at chapel hill, USA

Stand-Alone Paper
Reimagining Science Education: A Culturally Sustaining, Health-Centric Approach Addressing Type 2 Diabetes
Miriam Ortiz, University of Texas Rio Grande Valley, USA
Angela Chapman*, University of Texas Rio Grande Valley, USA

Research Experiences for Teachers (RETs) Through the Lens of Rightful Presence

Strand 8: In-service Science Teacher Education
24-Mar-25, 10:00 AM-11:30 AM
Location: Annapolis 3

Related Paper Set
Science teachers in research experiences: Learning from 25 years of RETs to inform future programs
Karen Woodruff*, Kean University, USA
Suzanne Patzelt*, Touro University, USA

Related Paper Set
Understanding Science Science Teaching as Political Domains: RET Teachers Enactment of Justice-Centered Pedagogies
Shannon Davidson*, University of Alabama, USA
Roxanne Hughes, Florida State University, USA
Stacey Hardin, University of Washington, USA

Related Paper Set
Exploring Power Dynamics in Teacher Research Experiences: Insights from bacteriophage discovery in K-12 classrooms
Chris Pavlovich*, Montana Technological University, USA
Rayelynn Brandl, Montana Technological University, USA
Marisa Pedulla, Montana Technological University, USA

Related Paper Set
Developing Dispositions for Indigenous Science and Engineering Knowledge in Elementary Science Teachers through a RET
Linda Rost, Baker High School, USA
Rebecca Hite*, Texas Tech University, USA
Gina Childers*, Texas Tech University, USA
Sweeney Windchief, Montana State University, USA

Biological Phenomena and Their Roles in Designing and Evaluating Assessments of Student Understanding and Learning

Strand 10: Curriculum and Assessment
24-Mar-25, 10:00 AM-11:30 AM
Location: Magnolia 1

Related Paper Set
Characterizing the diversity of evolutionary phenomena in curricula and their relationships to causal-mechanistic explanations
Evan Abreu*, Stony Brook University, USA
Ross Nehm, Stony Brook University, USA

Related Paper Set
The structure and magnitude of novice evolutionary knowledge across phenomena using the CANS instrument
Gena Sbeglia*, San Diego State University, USA
Austin Zuckerman, University of California - San Diego, USA

Related Paper Set
Assessing student reasoning about matter and energy across biological phenomena using the MOMO
Austin Zuckerman*, San Diego State University, USA
Gena Sbeglia, San Diego State University, USA
Ross Nehm, Stony Brook University, USA

Related Paper Set
Evaluating undergraduate student's Perceptions of the Magnitude of Variation (PMoV) across biological phenomena
Cecylia Quintero*, San Diego State University, USA
Gena Sbeglia, San Diego State University, USA

Navigating Identity and Resilience in STEM Higher Education

Strand 11: Cultural, Social, and Gender Issues
24-Mar-25, 10:00 AM-11:30 AM
Location: Azalea 1

Stand-Alone Paper
Community college transfer students' navigations of boundary experiences through a storied science identity lens
Paul Le*, University of Colorado Denver, USA
Sarah Hug, Colorado Evaluation and Research Consulting, USA
Laurel Hartley, University of Colorado Denver, USA

Stand-Alone Paper
The Role of Socialized Assumptions in Shaping Identities of Women in Mathematically Intensive STEM Majors
Terrie Galanti*, University of North Florida, USA
Nancy Holincheck*, George Mason University, USA
Tiffany Butler*, George Mason University, USA

Stand-Alone Paper
Understanding Differences in Perceived Viability by Physicists in Careers for Academia, Government and Private Industry
Daniel Oleynik*, University of Central Florida, USA

Erin Scanlon, University of Connecticut - Avery Point, USA
Constance Doty, University of Central Florida, USA
Jacquelyn Chini, Ohio State University, USA

Stand-Alone Paper
Graduate Student Resilience: Using Survey Analysis to Explore Influential Factors in U.S. Graduate Education
Karen Collier*, Augusta University, USA
Margaret Blanchard*, North Carolina State University, USA

Stand-Alone Paper
Identity Development of Scientists with (dis)Abilities
Jonathan Hall*, California State University, San Bernardino, USA
Mila Rosa Carden*, University of North Texas, USA
Sarah Losoya*, University of North Texas, USA

Powered decision-making for equity in science education: Beyond access and inclusion

Strand 11: Cultural, Social, and Gender Issues
24-Mar-25, 10:00 AM-11:30 AM
Location: Annapolis 2

Symposium
Powered decision-making for equity in science education: Beyond access and inclusion
Elizabeth Davis*, University of Michigan, USA
Sage Andersen, University of Texas, USA
Jessica Bautista, University of Michigan, USA
Terrance Burgess, Michigan State University, USA
Heidi Carlone,Vanderbilt University, USA
Symone Gyles, University of California, USA
Stefanie Marshall, Michigan State University, USA
Veronica McGowan, University of Washington, USA
Jordan Sherry-Wagner, University of Washington, USA
Michele Williams, University of Illinois, USA
Carrie Tzou, University of Washington, USA

Innovative Exploration in STEM Evaluation

Strand 12: Technology for Teaching, Learning, and Research
24-Mar-25, 10:00 AM-11:30 AM
Location: Baltimore 5

Stand-Alone Paper
Design and Usability Evaluation of an Innovative Educational App for Inquiry-Based Education
Iraya Yánez-Pérez, University of Burgos, Spain
Radu Bogdan Toma*, University of Burgos, Spain

Stand-Alone Paper
Developing an instrument to explore junior high school students' online science capital
Wei-Shou Chen*, Graduate Institute of Information and Computer Education, National Taiwan Normal University, Taiwan
Chin-Chung Tsai, Program of Learning Sciences, National Taiwan Normal University, Taiwan
Min-Hsien Lee, Program of Learning Sciences, National Taiwan Normal University, Taiwan

Jyh-Chong Liang, Program of Learning Sciences, National Taiwan Normal University, Taiwan

Stand-Alone Paper

Enhancing Chemistry Learning by Providing Formative Feedback and Assessment in Interactive Digital Learning Units

Florian Trautem*, University of Duisburg-Essen, Germany
Carolin Eitemüller, University of Duisburg-Essen, Germany
Maik Walpuski, University of Duisburg-Essen, Germany

Stand-Alone Paper

Empowering students' digital literacy in the AI era through the creation of Innovation Centers

Zacharoula Smyrnaiou*, Computer Technology Institute and Press "Diophantus", Greece
Eleni Georgakopoulou, National and Kapodistrian University of Athens, Greece
Martha Georgiou, National and Kapodistrian University of Athens, Greece

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Teaching to Develop Competent Outsiders: Preparing Students to Engage With Socioscientific Issues in Daily Life

Strand 13: History, Philosophy, Sociology, and Nature of Science
24-Mar-25, 10:00 AM-11:30 AM
Location: Baltimore 2

Related Paper Set

Promoting Motivation for Environmentally Responsible Teaching of Science Practices in Pre-Service Elementary Teachers

Benjamin Janney*, University of Utah, USA
Lynne Zummo, University of Utah, USA

Related Paper Set

'Science is... communication across the board": A biology teacher's conceptions of science media literacy

Daniel Pimentel*, The University of Alabama, USA

Related Paper Set

Science civic engagement self-concept and experiential learning in an introductory college course

Jenny Dauer*, University of Nebraska-Lincoln, USA
Jennifer Teshera-Levye, University of Nebraska-Lincoln, USA
Lisa Corwin, University of Colorado Boulder, USA
Christine Haney-Douglass, University of Nebraska-Lincoln, USA

Related Paper Set

Preparing Undergraduate Students to Resist Socioscientific Issues Mis/disinformation Through Collaboration with University Scientists

Sarah Poor*, University of Missouri, USA
Benjamin Herman, Texas A&M University, USA
Tamara Powers, Texas A&M University, USA

Related Paper Set

How Science Teachers Negotiate Identities to Manage Disconnects Between Science Inside and Outside the Classroom

Sam Evans*, University of Wisconsin, USA

Climate Literacy 2
Strand 14: Environmental Education and Sustainability
24-Mar-25, 10:00 AM-11:30 AM
Location: Baltimore 3

Stand-Alone Paper
A Systematic Review of Intervention Studies on Climate Literacy in K-12 Science Classrooms
Ayça Fackler*, University of Missouri, USA
Madeline Good, University of Missouri, USA
Ricardo Rojas Calderon, University of Missouri, USA
Emily Adah Miller, University of Georgia, USA

Stand-Alone Paper
Towards a Unified Framework for Climate Change Literacy in Science Education: A Systematic Literature Review
Helin Semilarski*, University of Tartu, Estonia
Helen Semilarski, University of Tartu, Estonia

Stand-Alone Paper
Concerns, Methods, Grade Bands that Allow the Teaching of Ecoliteracy
Peter Oyewole*, Kent State University, USA

Awards Luncheon
24-Mar-25, 11:30 AM-1:15 PM
Location: Woodrow Wilson Ballroom

Social Event

"Through the Lens of Leadership: Charting NARST's Growth and Impact with the Work of Its Fellows"
24-Mar-25, 1:30 PM-3:00 PM
Location: Annapolis 4

Administrative Session
Organizer
Amelia Gotwals, Michigan State University, USA

Basu Scholars Symposium: Presentation of the 2024 Basu Scholars
24-Mar-25, 1:30 PM-3:00 PM
Location: Annapolis 2

Symposium
Organizers
Regina McCurdy, Georgia Southern University, Statesboro, USA
Marsha Simon, Valdosta State University, USA
Khanh Tran, Purdue University, USA
Ilana De La Cruz, Texas A & M University, USA
Carol Waters,University of Houston-Clear Lake, USA
Alexandrea Muller, University of California - Santa Barbara, USA

Cognitive Load and Mechanistic Reasoning: The Role of Errors and Black Box Explication in Learning

Strand 1: Science Learning: Development of student understanding
24-Mar-25, 1:30 PM-3:00 PM
Location: Azalea 3

Stand-Alone Paper
Highlighting errors is worth it! - Erroneous examples foster learning gains and cognitive load in chemistry
Sonja Dieterich*, University of Duisburg-Essen, Germany
Stefan Rumann, University of Duisburg-Essen, Germany
Marc Rodemer, University of Duisburg-Essen, Germany

Stand-Alone Paper
The effect of black boxes on understanding mechanistic information
Michal Haskel-Ittah*, Weizmann Institute of Science, Israel
Shanny Mishal-Morgenstern, Weizmann Institute of Science, Israel

Stand-Alone Paper
Into the Black: The Effect of Black Box Explication on Biology Students' Mechanistic Reasoning
Gur Livni Alcasid*, Weizmann Institute of Science, Israel
Michal Haskel-Ittah, Weizmann Institute of Science, Israel

Exploring In Situ Engagement and Decision-Making in Science Education

Strand 2: Science Learning: Contexts, Characteristics and Interactions
24-Mar-25, 1:30 PM-3:00 PM
Location: Annapolis 1

Stand-Alone Paper
Field Study Science Observations in K-12 Settings: An Investigation of Pedagogical Strategies
Steph Dean*, Clemson University, USA
Devan Jones*, Clemson University, USA

Stand-Alone Paper
Engagement development of junior high school students during the enactment of Grand Challenges units
Shira Passentin*, Weizmann Institute of Science, Israel
Troy Sadler, University of North Carolina at Chapel Hill, USA
David Fortus, Weizmann Institute of Science, Israel

Stand-Alone Paper
Unraveling the Association between Perceptions of Science Instructions and Student Engagement across Grades
Xin Xia*, University of Virginia, USA
Robert Tai, University of Virginia, USA

Stand-Alone Paper
Who Shapes Science?: Elementary Students' Bids for Emergent Authentic Science with a University Entomologist
Sinead Brien*, University of South Carolina Upstate, USA
David Stroupe*, University of Utah, USA

Reforming STEM Education: Culturally Responsive and Inclusive Practices in Physics and Chemistry Teaching

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
24-Mar-25, 1:30 PM-3:00 PM
Location: Baltimore 4

Related Paper Set
Fostering Inclusivity: Transforming Physics and Chemistry Curricula for Diverse Classrooms
Clausell Mathis*, Michigan State University, USA
Joseph Krajick, Michigan State University, USA
Ehud Aviran, Michigan State University, USA
Ozlem Akcil Okan, Michigan State University, USA
Lucky Nonyelum,Michigan State University, USA
William Van Luven, Michigan State University, USA
Angie Valbuena Rojas, Michigan State University, USA
Barbara Schneider, Michigan State University, USA

Related Paper Set
Cultural Resources in Physics Education: A Study of Culturally Responsive Curriculum Development among Secondary Teachers
Ozlem Akcil Okan*, Michigan State University, USA
Clausell Mathis*, Michigan State University, USA
Lucky nonyelum, Michigan State University, USA

Related Paper Set
Politicized Care Dimensions in Physics Education: Pedagogical Practices and Engagement Case Study for Underserved Students.
Clausell Mathis*, Michigan State University, USA
Lama Jaber*, Florida State University, USA
Sherry Southerland*, Florida State University, USA

Related Paper Set
Perspectives of Critical Care of Minoritized Students: One Teachers Leveraging of Care for Science Learning
Sierra Morandi*, Florida State Univeristy, USA
Sherry Southerland, Florida State Univeristy, USA

Taking a Critical Look at Graduate Education in Physics

Strand 5: College Science Teaching and Learning (Grades 13-20)
24-Mar-25, 1:30 PM-3:00 PM
Location: Magnolia 3

Related Paper Set
Investigating the Landscape of Physics Graduate Program Requirements
Bill Bridges*, Kansas State University, USA
Daniel Sharkey, Ohio State University, USA
Jacquelyn Chini, Ohio State University, USA
Rachel Henderson, Michigan State University, USA
James Laverty,Kansas State University, USA

Related Paper Set
Why they stay: Counternarratives of women PhD students in physics
R Strain, Auburn University, USA
Eric Burkholder*, Auburn University, USA

Related Paper Set
Study of a nontraditional physics doctoral student's program departure
Eric Burkholder*, Auburn University, USA
Steven Cortez, Auburn University, USA

Related Paper Set
A Change Agents' Experience Reforming Physics Candidacy Exams
Daniel Sharkey*, The Ohio State University, USA
Bill Bridges, Kansas State University, USA
James Laverty, Kansas State University, USA
Rachel Henderson, Michigan State University, USA
Jacquelyn Chini,The Ohio State University, USA

Building Reflective and Supportive Pathways in Preservice Teacher Education

Strand 7: Pre-service Science Teacher Education
24-Mar-25, 1:30 PM-3:00 PM
Location: Baltimore 1

Stand-Alone Paper
The Noyce Pre-Residency: Early field experiences used to recruit individuals to become science teachers
Sarah McCorrison*, University of South Alabama, USA
André Green, East Carolina University, USA
Susan Ferguson, University of South Alabama, USA

Stand-Alone Paper
Developing Effective Mentor Teachers for Preservice Science Teachers: Relational, Developmental, and Contextual Dimensions
Maria Rivera Maulucci*, Barnard College, USA

Stand-Alone Paper
Development and Evaluation of a University Seminar to Foster Reflection Competency
Oliver Tepner*, University of Regensburg, Germany
Stefanie Reimer, University of Regensburg, Germany

Climate Literacy and Environmental Awareness

Strand 7: Pre-service Science Teacher Education
24-Mar-25, 1:30 PM-3:00 PM
Location: Baltimore 2

Stand-Alone Paper
Promoting ICT literacy in pre-service science teacher education with gamification-elements designed for species protection awareness
Ann-Katrin Krebs*, Leuphana University Lueneburg, Germany

Stand-Alone Paper
Science Preservice Teachers' Transformative Approaches to Climate Change Education
Kaylee Laub*, University of California, Santa Barbara, USA

John Galisky, University of California, Santa Barbara, USA
Liliana Garcia, University of California, Santa Barbara, USA
Matthew Shackley, University of California, Santa Barbara, USA
Julie Bianchini,University of California, Santa Barbara, USA

Co-Design and Professional Learning in Curriculum Development

Strand 8: In-service Science Teacher Education
24-Mar-25, 1:30 PM-3:00 PM
Location: Annapolis 3

Stand-Alone Paper
Moving Beyond the NGSS: Integrating Multiple Ways of Knowing and Sustainability into Co-Designed Curriculum Units
Julia Poel*, University of Illinois Urbana-Champaign, USA
Nicholas Leonardi*, University of Illinois Urbana-Champaign, USA
McKenna Lane*, University of Illinois Urbana-Champaign, USA
Barbara Hug*, University of Illinois Urbana-Champaign, USA

Stand-Alone Paper
How Professional Learning with Educative Curriculum Materials Supports Teachers Modeling Knowledge and Pedagogical Design Capacity
Karen Lionberger*, WestEd, USA

Stand-Alone Paper
Opportunities to Learn Using Curriculum Cases in Professional Development
Nicholas Leonardi*, University of Illinois Urbana-Champaign, USA
Julia Poel*, University of Illinois Urbana-Champaign, USA
McKenna Lane*, University of Illinois Urbana-Champaign, USA
Barbara Hug*, University of Illinois Urbana-Champaign, USA

Stand-Alone Paper
Catalyzing Change: Influence of Teacher Collaborative Curriculum (re)design on Teacher Practice and Student Learning
Sherry Ssoutherland*, Florida State University, USA
Patrick Enderle, Georgia State University, USA
Jennifer Schellinger, Florida State University, USA
Will Rogers, Yale, USA
Ellen Granger,Florida State University, USA
Todd Bevis, Florida State University, USA
Sierra Morandi, Florida State University, USA
Ruveyde Kaya, Florida State University, USA

Stand-Alone Paper
'Your insights give me a better understanding": Co-Learning in a Curriculum Design Partnership
Symone Gyles*, University of California, Irvine, USA

Integrating Research, Industry, and Pedagogy in STEM Education

Strand 8: In-service Science Teacher Education
24-Mar-25, 1:30 PM-3:00 PM
Location: Magnolia 2

Stand-Alone Paper
Translating Research Lab Experiences into Classroom Experiences: Impacts on Teaching Beliefs, Content, and Pedagogy
Elizabeth Edmondson*, Virginia Commonwealth University, USA
Eric Lindley*, Virginia Commonwealth University, USA
Hsin-Ling Hung, Virginia Commonwealth University, USA
Linda Le, Virginia Commonwealth University, USA

Stand-Alone Paper
Secondary science teachers' goal conflicts in an alternative energy focused engineering RET project
Joseph Brobst*, Old Dominion University, USA

Stand-Alone Paper
From Industry to Classroom: The Benefits of Combining STEM Industry Immersion with Pedagogical PD
Vance Kite*, Kenan Fellows Program for Teacher Leadership, USA
Kevin Winn, Friday Institute for Education Innovation, USA
Teresa Leavens, Friday Institute for Education Innovation, USA
William Reynolds, North Carolina State University, USA

Stand-Alone Paper
Science educators' engagement and practice changes in a design-based implementation research (DBIR) initiative
Melissa Livingston*, Oregon State University, USA
Cory Buxton, Oregon State University, USA
Camila Kennedy, Education Northwest, USA

Advancing Measurement of Science Learning

Strand 10: Curriculum and Assessment
24-Mar-25, 1:30 PM-3:00 PM
Location: Magnolia 1

Stand-Alone Paper
Development and Validation of the Diagnostic Test for Heuristics in Chemistry using Rasch Measurement Approach
Jonathan Barcelo*, Saint Louis University, Philippines

Stand-Alone Paper
Measuring Giftedness in Biology: Development and Validation of Subject-Specific Test Instruments
Colin Peperkorn*, Bielefeld University, Germany
Claas Wegner, Bielefeld University, Germany

Stand-Alone Paper
Applying Machine Learning Methods to Understand Differential Item Functioning in a Flu Knowledge Assessment
Tanvi Banerjee, Wright State University, USA
William Romine*, Kairos Research, USA
Derrick Cox*, Wright State University, USA

Stand-Alone Paper
Assessing Reliability and Validity of a Science Content Knowledge Questionnaire for Elementary PSTs: Rasch Modeling
Soon Lee*, Kennesaw State University, USA
Anna Arias, Kennesaw State University, USA
Preethi Titu, Kennesaw State University, USA
Jessica Reaves, Kennesaw State University, USA
Rasheda Likely,Kennesaw State University, USA

Learning from Black Students, Teachers, and Stories in Science/STEM Education

Strand 11: Cultural, Social, and Gender Issues
24-Mar-25, 1:30 PM-3:00 PM
Location: Azalea 1

Stand-Alone Paper
'In the minority from the jump'': Black Men Teachers and Their Experiences in Science Education
Joshua Modeste*, Teachers College, Columbia University, USA
Felicia Mensah*, Teachers College, Columbia University, USA

Stand-Alone Paper
Interrogating anti-Blackness in STEM education: Argument countering the erasure to promoting Black excellence in STEM
Theila Smith*, Brooklyn College (CUNY), USA
Takeshia Pierre*, Tufts University, USA
Bhaskar Upadhyay, University of Minnesota, USA

Stand-Alone Paper
Re-Humanizing the Br-other: Implications for the Next Generation as Advised by Black Men in STEM
Takeshia Pierre*, Tufts University, USA
Latoya Haynes-Thoby, University of Connecticut, USA

Stand-Alone Paper
The Untold Counterstory: A Researcher's Account of Investigating the Experiences of Black Students Studying Biology
Analisa Brown*, University of California, Davis, USA

Supporting Youth Agency and Belonging in STEM Education

Strand 11: Cultural, Social, and Gender Issues
24-Mar-25, 1:30 PM-3:00 PM
Location: Azalea 2

Stand-Alone Paper
Concurrent Phenomenological Analysis of STEM Career Aspirations in Underrepresented Youth: Role of Experiences and Identity
Amdad Ahmed Awsaf*, Florida International University, USA
Nicole Giansanti, Florida International University, USA
Susan Sunbury, Harvard University, USA
Remy Dou, Florida International University, USA

Stand-Alone Paper
Spacetimematter Entanglements in a Digital Environmental Story
Mary Short*, Smithsonian Institution, USA

Stand-Alone Paper
You are the Dreamer the Dream: Black Nerds Reimagining Space Time Through Counterspaces STEM Identities
Brandi Cannon*, Stanford University, USA

Stand-Alone Paper
Bicycles and STEM: Unearthing Black and Brown Genius
Noemi Waight*, University at Buffalo, USA
Ryan Rish, University at Buffalo, USA
Jennifer Tripp*, University at Buffalo, USA
Sophie Wisoff, GOBike, USA
Darryl Marks,East Side Bike Club, USA

Working collaboratively with AI to produce learning progression-based feedback

Strand 12: Technology for Teaching, Learning, and Research
24-Mar-25, 1:30 PM-3:00 PM
Location: Baltimore 5

Related Paper Set
Generating Learning Progression-based Actionable Feedback to Support Students' Three-Dimensional Learning: A Large Language Model Approach
Peng He*, Washington State University, USA

Related Paper Set
Learning Progression-Guided AI Evaluation of Scientific Models To Support Diverse Multi-Modal Understanding in NGSS Classroom
Leonora Kaldaras*, Texas Tech University, USA
Tingting Li, Michigan State University, USA
Prudence Djagba, Michigan State University, USA
Kevin Haudek, Michigan State University, USA
Joseph Krajcik,Michigan State University, USA

Related Paper Set
Collaborating with Teachers to Generate ML-Based Feedback: Contextualizing and Developing Meaningful and Relevant Feedback
Selin Akgun*, University of Minnesota, USA
Kevin Haudek, Michigan State University, USA
Leonora Kaldaras, Michigan State University, USA
Joseph Krajcik, Michigan State University, USA

Related Paper Set
Feedback on Utilizing Deep Learning AI to Analyze Scientific Models
Tingting Li*, Washington State University, USA
Leonora Kaldaras, c. University of Colorado Boulder, USA
Kevin Haudek, Michigan State University, USA
Joseph Krajcik, CREATE for STEM Institute, USA

A Moral Inquiry into Epistemic Insight through Socioscientific Issues: Global Perspectives

Strand 13: History, Philosophy, Sociology, and Nature of Science
24-Mar-25, 1:30 PM-3:00 PM
Location: Camellia 1

Symposium
A Moral Inquiry into Epistemic Insight through Socioscientific Issues: Global Perspectives
Dana Zeidler*, University of South Florida, USA
Fouad Abd-El-Khalick, University of Massachusetts Amherst, USA
Rola Khishfe, American University of Beirut, Lebanon
Yeonjoo Ko, Jeju National University, Korea, Republic of
Shiang-Yao Liu,Taiwan Normal University, Taiwan
Amanda McCrory, University College London, United Kingdom
Li Le, University of Nevada-Reno, USA
Troy Sadler, University of North Carolina, Chapel Hill, USA
Ben Herman, Texas A&M University, USA
Martha Georgiou, University of Athens, Greece

School, Family & Community Participation

Strand 14: Environmental Education and Sustainability
24-Mar-25, 1:30 PM-3:00 PM
Location: Baltimore 3

Stand-Alone Paper
Family Promoted Access to Children's Interactions with Biodiversity and Outdoor Play
Allison Antink-Meyer*, Illinois State University, USA
Anthony Lorsbach, Illinois State University, USA
Ryan Brown, Illinois State University, USA

Stand-Alone Paper
Into the Weeds: Pro-Environmental Behavior Through the North Carolina Native Plant Forum on Facebook
Sera Harold*, North Carolina State University, USA
Carla Johnson, North Carolina State University, USA

Stand-Alone Paper
Middle School Students' Environmental Moral Reasoning on Socioscientific Issues: Terrestrial vs. Extraterrestrial Environments
Cansu Basak Uygun*, Middle East Technical University, Turkey
Özgül Yilmaz-Tuzun, Middle East Technical University, Turkey

Stand-Alone Paper
Bringing Together Global Experts Insights on One Health Education to Enhance Scientific Literacy
Sascha Johann, Justus Liebig University, Germany
Benedikt Heuckmann, University of Münster, Germany
Ulrich Hobusch, University College for Agricultural and Environmental Education, Austria
Kerstin Kremer*, Justus Liebig University, Germany

In praise of Science Teachers: Through the Eyes of STEM Gatekeepers for Black Scientists - Essential Partners in Researching, Reframing, and Reforming Science Teaching, Learning, and Learning to Teach

24-Mar-25, 3:15 PM-4:45 PM
Location: Annapolis 2

Administrative Session
Organizers
Rona Robinson-Hill, Ball State University, USA
Shari Watkins, American University, Washington DC, USA
Jonathan Hall, California State University, San Bernardino, USA
Panelists
Lanier Watkins, John Hopkins University, USA
Kristina Kramarczuk,University of Maryland, College Park, USA
Quinton Williams, Howard University, Washington DC, USA
Mariano Sto. Domingo, University of Maryland, USA
Meg Bentley, American University, Washington DC, USA

Publishing, Reviewing, and Writing for JRST

24-Mar-25, 3:15 PM-4:45 PM
Location: Azalea 2

Administrative Session
Organizers
Felicia Moore Mensah, Teachers College, Columbia University, USA
Troy Sadler, University of North Carolina at Chapel Hill, USA
Matthew Kloser, University of Notre Dame, USA
Dana Vedder-Weiss, University of the Negev, Israel
Edna Tan,University of North Carolina Greensboro, USA

Transformative educational environments in STEM classroom: The role of contexts and instructors in centering students

Strand 2: Science Learning: Contexts, Characteristics and Interactions
24-Mar-25, 3:15 PM-4:45 PM
Location: Annapolis 1

Related Paper Set
Transdisciplinary teacher sensemaking during collaborative design centering student and community perspectives
Solaire Finkenstaedt-Quinn*, University of Michigan, USA
Ginger Shultz, University of Michigan, USA

Related Paper Set
'Meet them where they are": Chemistry Graduate Teaching Assistants' Noticing for Equity
Daisy Haas*, University of Michigan, USA
Dani Losinski, University of Michigan, USA
Ginger Shultz, University of Michigan, USA

Related Paper Set
Exploring Chemistry Teaching Assistant Pedagogy and Perspectives in Renovated vs. Unrenovated Instructional Laboratories
Meng-Yang Wu*, The Ohio State University, USA
Cassandra Miller, The Ohio State University, USA

Dalyanne Hernandez-Sanchez, The Ohio State University, USA

Related Paper Set

Why Do They Do What They Do? The drivers of learning assistant facilitation practices

Nicolette Maggiore*, Tufts University, USA
Jessica Karch, TERC, USA
Vesal Dini, Tufts University, USA
Ira Caspari-Gnann, Tufts University, USA

Related Paper Set

Pathways in Chemistry: Investigating the Learning Ecosystems of Introductory Chemistry Undergraduate Students

Jocelyn Nardo*, The Ohio State University, USA
Alison Anderson, The Ohio State University, USA
Johnathan Chisam, The Ohio State University, USA
Samantha Chrin, The Ohio State University, USA

Delving into the challenges and opportunities in STEM education, particularly in diverse and underrepresented contexts

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
24-Mar-25, 3:15 PM-4:45 PM
Location: Baltimore 4

Stand-Alone Paper

Exploring Students' Information Sources, Interests, and Perceptions on COVID-19 in a Rural US High School

Sahar Alameh*, University of Kentucky, USA
Anna Hoover, University of Kentucky, USA
Savannah Tucker, University of Kentucky, USA
Rebecca Smith, Adair County High School, USA

Stand-Alone Paper

Rural Middle Schools' Design and Implementation of STEM Career and Community Connected Project-based Learning Units

DeNae Kizys*, University of Sout Carolina, USA
Christine Lotter*, University of Sout Carolina, USA
Rachel Gilreath, University of Sout Carolina, USA
Lucas Perez, University of Sout Carolina, USA
Dodie Limberg,University of Sout Carolina, USA
Angela Starrett, University of Sout Carolina, USA

Stand-Alone Paper

Place-Based Learning and Career Interest in STEM: Joint Consideration of STEM Interest, Identity, and Demographics

Guan Saw*, Claremont Graduate University, USA
Kimberly Megyesi-Brem*, Claremont Graduate University, USA
Ryan Culbertson, Texas Tech University, USA
Paola Rosenberg*, Claremont Graduate University, USA

Stand-Alone Paper

Understanding Experiences of a Science Teacher Teaching Precollege Engineering Design Course: Challenges, Strategies, and Recommendations

Assad Iqbal*, Purdue University, USA
Adam Carberry, The Ohio State University, USA
Medha Dalal, Arizona State University, USA

STEM Career Development and Retention

Strand 5: College Science Teaching and Learning (Grades 13-20)
24-Mar-25, 3:15 PM-4:45 PM
Location: Magnolia 3

Stand-Alone Paper
A National Social and Academic Support Program: STEMM Career Choice and Retention
Or Shav-Artza*, Technion—Israel Institute of Technology, Israel
Shahaf Rocker Yoel, Technion—Israel Institute of Technology, Israel
Yehudit Dori, Technion—Israel Institute of Technology, Israel

Stand-Alone Paper
Exploring the Relationship between STEM Graduate Teaching Assistants Perceived Teaching Autonomy and Pedagogical Discontentment
Alyssa Freeman*, Middle Tennessee State University, USA
Beari Jangir, Middle Tennessee State University, USA
Marco Said, Middle Tennessee State University, USA
Chelsea Rolle, Middle Tennessee State University, USA
Kadence Riggs,Middle Tennessee State University, USA
Grant Gardner, Middle Tennessee State University, USA

Stand-Alone Paper
Teaching Beyond Tenure: The Role of Identity in STEM Faculty's Instructional Choices
Sule Aksoy*, CUNY Graduate Center, USA

Stand-Alone Paper
Examining Post-Lesson Conversations of STEM Undergraduate Faculty Instructional Change Teams: What Makes Them (Un)Productive?
Josie Melton*, Western Washington University, USA
Dustin Van Orman, Western Washington University, USA
Daniel Hanley, Western Washington University, USA
Sophie Westermann, Western Washington University, USA
Abbey Gray,Western Washington University, USA
Makayla Wilson, Western Washington University, USA

Equity and Social Justice in Teacher Education

Strand 7: Pre-service Science Teacher Education
24-Mar-25, 3:15 PM-4:45 PM
Location: Baltimore 1

Stand-Alone Paper
Starting with the Problem: Preservice Elementary Teachers' Ideas for Teaching a Social Justice Science Issue
Jessica Bautista*, University of Michigan, USA

Stand-Alone Paper
Creating a Critically White Practice-Based Science Teacher Education
Jonathan McCausland*, Iona University, USA

Stand-Alone Paper
Conceptualizing a framework for culturally nurturing science teacher identity
Khanh Tran*, Purdue University, USA
Lynn Bryan, Purdue University, USA
Jenna Gist*, Purdue University, USA

Insights on Preservice Teachers' Teaching and Learning practices

Strand 7: Pre-service Science Teacher Education
24-Mar-25, 3:15 PM-4:45 PM
Location: Baltimore 2

Stand-Alone Paper
Pre-Service Teachers' Conceptions of Critical Thinking and Inquiry
Steffen Wagner*, Humboldt-Universität zu Berlin, Germany
Burkhard Priemer, Humboldt-Universität zu Berlin, Germany

Stand-Alone Paper
'They find answers on their own": Novice Teachers' Trajectories for Teaching for Scientific Sensemaking
Patricia Bills*, Oakland University, USA
Amber Bismack, Oakland University, USA

Stand-Alone Paper
Transforming Biology Teacher Education: Fostering Reflective Skills and Research Competence through Inquiry-Based Learning
Pauline Sommerer*, Institute for Biology Education, University of Cologne, Germany
Nadine Großmann, Institute for Biology Education, University of Cologne, Germany
Jörg Großschedl, Institute for Biology Education, University of Cologne, Germany

Stand-Alone Paper
Enhancing Scientific Literacy in Distance Elementary Education: A closeup on Pre-Service Teacher Beliefs and Practices
Keren Dagan*, Technion, Israel
Dina Tsybulsky, Technion, Israel

Professional Development and Resource Utilization for Early Career STEM Educators

Strand 8: In-service Science Teacher Education
24-Mar-25, 3:15 PM-4:45 PM
Location: Annapolis 3

Stand-Alone Paper
Emotional Resilience Narratives in New Science Teachers' Lessons: Delineating Emotion-Attuned Science Instruction
Ella Yonai*, University of Georgia, USA
Elizabeth Ayano, University of Georgia, USA
Jose Pavez, Western Illinois University, USA
Lisa Borgerding, Kent State University, USA
Shannon Navy,Kent State University, USA

Stand-Alone Paper
'Foundational knowledge is paramount": Early Career Science Teachers Use of Personal Resources

Adepeju Prince*, Kent State University, USA
Shannon Navy, Kent State University, USA

Stand-Alone Paper
Early Career Science and Mathematics Teachers' Access to and Use of Resources Over Two Years
Robert Idsardi*, Eastern Washington University, USA
Emily Hamada, Eastern Washington University, USA
Shannon Navy, Kent State University, USA
Lisa Borgerding, Kent State University, USA
Julie Luft,University of Georgia, USA
Ella Yonai, University of Georgia, USA

Stand-Alone Paper
Novice Secondary Teachers' Developing Beliefs about Project-Based Learning
KARTHIGEYAN SUBRAMANIAM*, University of North Texas, USA
Mila Rosa Carden*, University of North Texas, USA
Chris Long, University of North Texas, USA
Pamela Pamela Esprívalo Harrell, University of North Texas, USA
Marlon Harris,University of North Texas, USA
Ruthanne Thompson, University of North Texas, USA

Teacher Identity and Emotional Dynamics in Science Education Practice

Strand 8: In-service Science Teacher Education
24-Mar-25, 3:15 PM-4:45 PM
Location: Magnolia 2

Stand-Alone Paper
The role of leveraging emotions in elementary science teachers making changes to practice
Andrea Phillips*, Indiana University, USA

Stand-Alone Paper
Latent Profiles of U.S. Science Teacher Identities
Xiufeng Liu*, University of Macau, China
Jennifer Tripp, University at Buffalo, USA

Stand-Alone Paper
Investigating Science Leadership Professional Identity
Jennifer Bateman*, University of Georgia, USA
Brooke Whitworth, Clemson University, USA
Golnaz Arastoopour-Irgens, Vanderbilt University, USA

Stand-Alone Paper
Embodied Praxis: How Teacher Identity Influences Instruction
Heather Shaffery*, University of Oklahoma, USA

Innovative Approaches for Developing Science Curriculum and Assessment

Strand 10: Curriculum and Assessment
24-Mar-25, 3:15 PM-4:45 PM
Location: Magnolia 1

Stand-Alone Paper
Implementing Grand Challenges in Middle School Classrooms: A Case Study of Innovative Curricula Implementation
Rebecca Lesnefsky*, University of North Carolina, USA
Natasha Segal, Weizmann Institute of Science, Israel
Zhen Xu, University of North Carolina, USA
Nannan Fan, University of North Carolina, USA
Heewoo Lee,University of North Carolina, USA
Shira Passentin, Weizmann Institute of Science, Israel
Keren Dalyot, Weizmann Institute of Science, Israel
David Fortus, Weizmann Institute of Science, Israel
Troy Sadler, University of North Carolina, USA

Stand-Alone Paper
'You get to tinker with your brain": Middle school students' perspectives on three-dimensional, phenomenon-driven assessments
Cari Herrmann-ABell*, BSCS Science Learning, USA
Clarissa Deverel-Rico, BSCS Science Learning, USA
Patricia Olson, BSCS Science Learning, USA
Chris Wilson, BSCS Science Learning, USA

Stand-Alone Paper
Designing Three-Dimensional Assessment Tasks for Classroom Formative Assessment
Alexander Paulchell*, University of Arizona, USA
Malissa Hubbard*, University of Arizona, USA
Mingfeng Xue, University of California, Berkeley, USA
Kristin Gunckel, University of Arizona, USA
Linda Morell,University of California, Berkeley, USA
Mark Wilson, University of California, Berkeley, USA

Stand-Alone Paper
Scripted Curriculum in the Science Classroom
Maizie Dyess*, University of Nevada, Las Vegas, USA
Burak Sahin*, University of Nevada, Las Vegas, USA
Katherine Wade-Jaimes*, University of Nevada, Las Vegas, USA

Critical Science Consciousness: A Framework and Applications Across Science Teachers, Teacher Educators, and Researchers

Strand 11: Cultural, Social, and Gender Issues
24-Mar-25, 3:15 PM-4:45 PM
Location: Azalea 1

Symposium
Critical Science Consciousness: A Framework and Applications Across Science Teachers, Teacher Educators, and Researchers

Megan Walser*, Michigan State University, USA
Kate Miller, Michigan State University, USA
Sinead Brien, University of South Carolina Upstate, USA
Lenora Crabtree, University of North Carolina Charlotte, USA
Nick Confer,Washington-Liberty High School, USA
Nicole Hefty, West Ottawa High School, USA
Taylor MacKenzie, Waverly High School, USA
Andrea Nguyen, Macatawa Bay Middle School, USA

Teachers' Approaches to Indigenizing STEM Education through Instructional Practice and Curriculum

Strand 11: Cultural, Social, and Gender Issues
24-Mar-25, 3:15 PM-4:45 PM
Location: Annapolis 4

Symposium

Teachers' Approaches to Indigenizing STEM Education through Instructional Practice and Curriculum

Kathryn Gardner-Vandy*, Oklahoma State University, USA
Jillian Cicek, University of Manitoba, Canada
Rebekah Hammack*, Purdue, USA
Mishack Gumbo, University of South Africa, South Africa
Noelani Puniwai,University of Hawai'i at Mānoa, USA
Julie Robinson, University of North Dakota, USA
Rif'ati Handayani, University of Jember – Indonesia, Indonesia
Beth Covitt, University of Montana, USA
Leena Kanandjebo, University of Namibia, Namibia
Faustina Kashinauua, University of Namibia, Namibia

Student Performance in STEM Education

Strand 12: Technology for Teaching, Learning, and Research
24-Mar-25, 3:15 PM-4:45 PM
Location: Baltimore 5

Stand-Alone Paper

Utilizing Eye Tracking Data to Monitor the Impact of Multimedia Learning Content on Student Performance

Muhammad Rehman*, University of Florida, USA
Do Hyong Koh, University of Florida, USA
Christine Wusylko, University of Florida, USA
Priya Prasad, University of Florida, USA
Xiaoman Wang,University of Florida, USA
Pavlo Antonenko, University of Florida, USA
Kara Dawson, University of Florida, USA
Albert Ritzhaupt, University of Florida, USA
Jonathan Martin, University of Florida, USA
Ellen Martin, University of Florida, USA

Stand-Alone Paper

Impact of Computing-STEM Curriculum on University Students' Computer Programming Self-efficacy, Understanding, and Problem-Solving Performance

Shu-Fen Lin*, National Changhua University of Education, Taiwan
Dong-Ke Huang, National Changhua University of Education, Taiwan

Stand-Alone Paper
Fostering Scientific Creativity in Health-Allied STEM Students Using the Contextualized General Physics Courseware Package
Fredyrose Ivan Pinar*, De La Salle University, Philippines
Lydia Roleda, De La Salle University, Philippines

Stand-Alone Paper
Exploring the Potential of STEM Media Read-Alouds
Lauren Shea*, American University, USA

Climate Change Action
Strand 14: Environmental Education and Sustainability
24-Mar-25, 3:15 PM-4:45 PM
Location: Baltimore 3

Stand-Alone Paper
The Knowledge and Action Intentions of Tomorrow's Citizens in Facing the Climate Change Challenge
Oshra Aloni*, The Weizmann Institute of Science, Israel
Ornit Spektor-Levy, Bar Ilan University, Israel
Orit Ben Zvi Assaraf, Ben Gurion University of the Negev, Israel
Yael Shwartz, The Weizmann Institute of Science, Israel
Anat Yarden,The Weizmann Institute of Science, Israel

Stand-Alone Paper
Localizing Climate Change Education: Impacts on Student Knowledge and Agency in High School Science Classrooms
Jeffrey Snowden*, BSCS Science Learning, USA
Emily Harris, BSCS Science Learning, USA
Lindsey Mohan, BSCS Science Learning, USA

Stand-Alone Paper
A Cross-Cultural Study Comparing Turkish and Indonesian Preservice Science Teachers' Orientations towards Climate Change
Osman Aksit, Bogazici University, Turkey
Gaye Ceyhan, Bogazici University, Turkey
Rita Hagevik*, University of North Carolina – Pembroke, USA
Nejla Yürük, Gazi University, Turkey
Betül Alatlı,Balıkesir University, Turkey
Sabri Kocakülah, Balıkesir University, Turkey
Emine Adadan, Bogazici University, Turkey
Sedat Uçar, Cukurova University, Turkey
Ebru Muğaloğlu, Bogazici University, Turkey
Laura Wheeler, Brigham Young University, USA
Hartono Hartono, Sriwijaya University, Indonesia
Rita Inderawati, Sriwijaya University, Indonesia
Sofendi Sofendi, Sriwijaya University, Indonesia
Pelin Aksüt Arslan, Bolu Abant Izzet Baysal University, Turkey
Kathy Trundle, Utah State University,

Stand-Alone Paper
Diverse Roles of Environmental Educators: Science Content Experts, Professional Development Providers, Environmental Advocates, and Mentors
Hamza Malik*, Lloyd Center for the Environment, USA
Stephen Witzig*, University of Massachusetts Darmouth, USA

Rachel Stronach*, Lloyd Center for the Environment, USA

Implementing Science Education Reform: Understanding Stakeholder Perspectives, Roles, and Factors

Strand 15: Policy, Reform, and Program Evaluation
24-Mar-25, 3:15 PM-4:45 PM
Location: Camellia 1

Stand-Alone Paper

A spotlight on science education in Australian early childhood teacher qualifications

Cristina Guarrella*, The University of Melbourne, Australia
Caroline Cohrssen, University of New England, Australia
Naomi Lilley, The University of Melbourne, Australia

Stand-Alone Paper

The Grand challenges Project in Middle Schools: Principals as Adopters and Leaders of Reform Curricula

Keren Dalyot*, Weizmann Institute of Science, Israel
Troy Sadler, University of North Carolina Chapel Hil, USA
David Fortus, Weizmann Institute of Science, Israel

Stand-Alone Paper

Exploring the Nexus of Teaching and Research Productivity in a Research-Intensive University among STEM Faculty

Anna Kye*, University of California Irvine, USA
Brian Sato, University of California Irvine, USA
Kameryn Denaro, University of California Irvine, USA

Graduate Student Forum

24-Mar-25, 4:45 PM-6:15 PM
Location: Cherry Blossom Terrace

Social Event

Jennifer Bateman, University of Georgia, Athens, USA

Poster Session

24-Mar-25, 4:45 PM-6:15 PM
Location: Cherry Blossom Ballroom

Strand 1: Science Learning: Development of student understanding
Poster

Modeling as an Approach to Encourage Moral Deliberations during SSI Decision-Making

Jamie Elsner*, University of North Carolina at Chapel Hill, USA
Zhen XU, University of North Carolina at Chapel Hill, USA
Eric Kirk, University of North Carolina at Chapel Hill, USA
Laura Zangori, University of Missouri, USA

Strand 1: Science Learning: Development of student understanding
Poster

Unlocking Interdisciplinary Insights and Understandings on Carbon Cycling Through Topic Modeling

Hyesun You*, The University of Iowa, USA
Minju Hong, University of Arkansas, USA
Seungho Maeng, Seoul National University of Education, Korea, Republic of

Strand 1: Science Learning: Development of student understanding
Poster
Fostering Students' Understanding of Ecosystems and Metamodeling Knowledge
Jinzhi Zhou*, Indiana University, USA
Qiuyu Lin, Rutgers University, USA
Zach Ryan, Indiana University, USA
Cindy Hmelo-Silver, Indiana University, USA
Joshua Danish,Indiana University, USA
Ravit Duncan, Rutgers University, USA
Clark Chinn, Rutgers University, USA

Strand 1: Science Learning: Development of student understanding
Poster
Exploring the role of the body in supporting mechanistic reasoning
Genelle Diaz-Silveira*, Boston University, USA
Eve Manz, Boston University, USA

Strand 1: Science Learning: Development of student understanding
Poster
Learning How the Respiratory System Works Through Scientific Modeling in Early Childhood
Dulce González Ramírez, Instituto Superior de Investigación y Docencia para el Magisterio, Mexico
Silvia Ramos De Robles, University of Guadalajara, Mexico
Verónica Pérez Serrano Flores*, Universidad Panamericana, Mexico

Strand 1: Science Learning: Development of student understanding
Poster
Fostering Scientific Practices Through Critique: The Impact of Structured Peer Feedback on Ninth-Grade Students
SaeYeol Yoon*, Delaware State University, USA
Nurcan Keles, Dicle University, Turkey
Claudia Aguirre-Mendez, Emporia State University, USA
Brian Hand, University of Iowa, USA

Strand 1: Science Learning: Development of student understanding
Poster
The Pathways to Quantum Immersion Program
Jessica Rosenberg*, George Mason University, USA
Nancy Holincheck*, George Mason University, USA
Benjamin Dreyfus, George Mason University, USA
Xiaolu Zhang, George Mason University, USA
Gen Konowe*, South Lakes High School, USA
Iamen Ibrahim, Forest Park High School, USA
Nathan D'Cruze, Richard Montgomery High School, USA

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Poster
Exploring high school students' practical epistemology, epistemic emotions, and self-efficacy in STEM learning activities
Min-Hsien Lee, National Taiwan Normal University, Taiwan
Wei-Shou Chen*, National Taiwan Normal University, Taiwan
Chia-Ching Lin, National Kaohsiung Normal University, Taiwan
Yen-Yuan Chen, National Taiwan University, College of Medicine, Taiwan

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Poster
Predictors of intention to donate stem cells to leukemia patients among young students
Julia Holzer*, University of Bremen, Germany
Doris Elster, University of Bremen, Germany

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Poster
Responsive Instruction Engagement in Science Practices: A Systematic Review of Pedagogical Strategies in Biology Education
Niki Koukoulidis*, University of Florida, USA
Julie Brown, University of Florida, USA

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Poster
Instructional Supports and Contexts for Enhancing the Level of Scientific Argumentation among Elementary Students
Hoon Jeong*, Department of Science Education, Seoul National University, Korea, Republic of
Soo-Yean Shim, Department of Science Education, Seoul National University, Korea, Republic of

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Poster
An Integrated Co-Design Framework: Applying Co-Design Across Science Education Settings
Anne Levendusky*, University of Florida, USA
Darby Drageset, University of Florida, USA

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Poster
Affection and cognition in science lessons at Elementary School: Discursive interactions with and about artifacts
Deborah Cotta*, Universidade Federal de Minas Gerais, Brazil
Danusa Munford, Universidade Federal do ABC, Brazil
Vanessa Neves, Universidade Federal de Minas Gerais, Brazil

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Poster
Epistemic Practices and Critical Thinking: Identifying Relationships Based on Chemistry Activities in a Brazilian School
Diorleno Santos, Universidade de São Paulo, Brazil
Matheus Damasceno, Universidade de São Paulo, Brazil
Lúcia Sasseron*, Universidade de São Paulo, Brazil

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Poster
What STEM Career Explorations Reveal About Rural High School Students' Motivations Towards STEM Career Pathways
Sera Harold*, North Carolina State University, USA
Brooke Bentley, North Carolina State University, USA
Margaret Blanchard, North Carolina State University, USA

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies
Poster
Lessons Learned Using ChatGPT to Create First Grade Science Lesson Plans
Wardell Powell*, Framingham State University, USA
Steve Courchesne, Framingham State University, USA

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies
Poster
Primary and Intermediate Elementary Teacher Background and Confidence in NGSS Implementation
Laura Longo*, SUNY Stony Brook, USA
Angela Kelly, SUNY Stony Brook, USA

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies
Bridging the Gap: Using Literacy to Teach Quantum Concepts in Elementary Education
Jennifer Simons*, George Mason University, USA
Cindy Hamblin*, Prince William County Schools, USA
Maya Butler-Hall, Anne Arundel County Public Schools, USA
Marin Moore, Alexandria City Public Schools, USA
Chanelle Carter,Prince George's County Public Schools, USA
Nancy Holincheck*, George Mason University, USA
Stephanie Dodman, George Mason University, USA
Jessica Rosenberg, George Mason University, USA
Benjamin Dreyfus, George Mason University, USA
Xiaolu Zhang, George Mason University, USA

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies
Poster
A Theoretical Game-Based Model For Scaffolding Elementary Science Instruction
Rob Monahan*, North Carolina State University, USA
James Minogue, North Carolina State University, USA

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies
Poster
Cultivating a STEM-driven School Culture: A Librarian's Journey
Carol Waters*, University of Houston-Clear Lake, USA

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
Poster
Teaching Circuits Using the EPo Concept: Impact on Conceptual Understanding in Middle Schools
Tilmann Steinmetz*, University of Tübingen, Germany
Jan-Philipp Burde, University of Tübingen, Germany
Thomas Schubatzky, Universität Innsbruck, Austria
Verena Spatz, TU Darmstadt, Germany
Martin Hopf,Universität Wien, Austria
Claudia Haagen-Schützenhöfer, Universität Graz, Austria
Lana Ivanjek, Johannes Kepler Universität Linz, Austria

Benedikt Gottschlich, University of Tübingen, Germany
Thomas Wilhelm, Goethe-Universität Frankfurt am Main, Germany

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
Poster
A digital and metacognitive tool to support high school students in decision making
Jana-Sabrin Blome, TU Dortmund University, Germany
Insa Melle*, TU Dortmund University, Germany

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
Poster
Remember, Recall, Retain: Unleashing the Power of CTCA in Computer Studies
Deborah Agbanimu, National Open University of Nigeria, Nigeria
Peter Okebukola*, Lagos State University-Nigeria
Juma Shabani, University of Burundi, Burundi
Franklin Onowugbeda, Lagos State University, Nigeria
Esther Peter,Lagos State University, Nigeria
Adekunle Oladejo, Lagos State University, Nigeria
Olasunkanmi Gbeleyi, Lagos State University, Nigeria
Ademola Ibukunolu, Lagos State University, Nigeria

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
Poster
The Data Fluency Framework for Teaching: A Conceptual Model of Teacher Knowledge for Data-Rich Instruction
Nicole Wong*, WestEd, USA
Rasha Elsayed, WestEd, USA
Leticia Perez, WestEd, USA
Corynn Del Core, WestEd, USA
Kirsten Daehler,WestEd, USA

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
Poster
Science teachers understanding of interdisciplinary teaching
Tiina Naissoo, Tallinn University, Estonia
Priit Reiska*, Tallinn University, Estonia
Birgit Soosalu, Tallinn University, Estonia

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
Poster
Deliberative argumentation to improve the understanding of climate change in a group of secondary students
Pablo Escobar, Pontificia Universidad Católica de Valparaíso, Chile
Claudia Vergara, Universidad Alberto Hurtado, Chile
Antonia Larrain, Universidad Alberto Hurtado, Chile
Hernan Cofré*, Pontificia Universidad Católica de Valparaíso, Chile

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
Poster
Food and Cooking: Inclusive Methods to "Do Science" and Draw on Student Assets
Kate Strangfeld*, Harvard University, USA
Pia Sörensen, Harvard University, USA

Strand 5: College Science Teaching and Learning (Grades 13-20)
Poster
Sharing Our Stories: Fostering Belonging in STEM Classrooms Using a Personal Narrative Activity
Melissa Zwick*, Stockton University, USA
Ally Hunter, Landmark College, USA

Strand 5: College Science Teaching and Learning (Grades 13-20)
Poster
Exploring The Relationship Between Self-Efficacy And Teaching Approach In Graduate Teaching Assistants
Cody Smith*, Missouri State University, USA

Strand 5: College Science Teaching and Learning (Grades 13-20)
Poster
Factors of Undergraduate Students' Academic Success in Introductory Chemistry: A Systematic Literature Review
Jessica Chestnut*, North Carolina State University, USA
Carla Johnson, North Carolina State University, USA

Strand 5: College Science Teaching and Learning (Grades 13-20)
Poster
New recognitions of self during a summer undergraduate research experience at an ecological field station
Anna Grinath*, Idaho State University, USA

Strand 5: College Science Teaching and Learning (Grades 13-20)
Poster
Chemistry Graduate Teaching Assistants' Pedagogical Commitments for Equity- and Justice-Focused Teaching Across Anti-DEI Contexts
Daisy Haas*, University of Michigan, USA
Safron Milne*, University of Michigan, USA
Ginger Shultz, University of Michigan, USA

Strand 5: College Science Teaching and Learning (Grades 13-20)
Poster
An Inclusive STEM Environment: Experiences of Students with Disabilities in the Introductory Chemistry Course
Natasha Johnson*, University of Toledo, USA

Strand 5: College Science Teaching and Learning (Grades 13-20)
Poster
Assessing the Impact of an Undergraduate Summer Research Program for Deaf and Hearing Chemistry Students
Isobel Cobb, James Madison University, USA
Frances Thiry, James Madison University, USA

Anneliese Rogerson, James Madison University, USA
Emma McGehee, James Madison University, USA
Savannah Sprouse,James Madison University, USA
Ashlynn Stacy, James Madison University, USA
Trinity Dovan, James Madison University, USA
Joseph Harsh*, James Madison University, USA

Strand 5: College Science Teaching and Learning (Grades 13-20)
Poster
Research Skill Development of Undergraduate STEM Students in the LSAMP Undergraduate Research Program
Niyazi Erdogan*, Texas A&M University, USA
Michael Preuss, West Texas A&M University, USA
John Avila, Texas A&M University, USA
Karen Butler-Purry, Texas A&M University, USA
Shannon Walton,Texas A&M University, USA
Pamela Obiomon, Prairie View A&M University, USA
Mahmoud Khasawneh, Texas A&M International University, USA
Barbara Szczerbinska, Texas A&M University - Corpus Christi, USA
Karan Watson, Texas A&M University, USA

Strand 5: College Science Teaching and Learning (Grades 13-20)
Poster
How Student Perceptions of Lab and Lecture Relate to Ideas on "Thinking Like a Chemist"
Michelle Sinapuelas*, San Francisco State University, USA
Seiham Alansary*, San Francisco State University, USA
Angelica Kochkarova*, San Francisco State University, USA

Strand 6: Science Learning in Informal Contexts
Poster
'They were normal people like us": exploring effects of a scientist-facilitated intervention on young people
Shannon Stubbs*, University of Galway, Ireland
Jennifer DeWitt, University of Galway, Ireland
Muriel Grenon, University of Galway, Ireland

Strand 6: Science Learning in Informal Contexts
Poster
Measuring sense of belonging in a museum: The impact of a museum-based teaching residency program
Anna MacPherson*, American Museum of Natural History, USA
Naina Abowd*, American Museum of Natural History, USA
Alexis Mayfield, American Museum of Natural History, USA
Margaret Hoffman, American Museum of Natural History, USA
Jacob Sienko,American Museum of Natural History, USA

Strand 6: Science Learning in Informal Contexts
Poster
A Meta-Analysis of Informal Science Education's Role in Shaping Student Interest and Attitudes
Xin Xia*, University of Virginia, USA
Lillian Bentley, University of Virginia, USA

Xitao Fan, The Chinese University of Hong Kong, China
Robert Tai, University of Virginia, USA

Strand 6: Science Learning in Informal Contexts
Poster
Nurturing Community and Reciprocity in Out-of-School STEM Programs: A Conceptual Framework
george schafer*, Drexel University, USA

Strand 6: Science Learning in Informal Contexts
Poster
The Impact of a Science Camp on Elementary Students' Science Identity and STEM Career Awareness
Elsun Seung*, Indiana State University, USA
Soonhye Park, North Carolina State University, USA
Aeran Choi, Ewha Womans University, Korea, Republic of

Strand 6: Science Learning in Informal Contexts
Poster
Female Students Choosing Science Fair: A Tale of Science Teachers' Impact and Science Identity Development
Justin Andersson*, University of Nebraska at Omaha, USA

Strand 6: Science Learning in Informal Contexts
Poster
Connections between Science Curiosity and Youth's Making in Afterschool STEM Programs
Jennifer Weible*, Central Michigan University, USA

Strand 6: Science Learning in Informal Contexts
Poster
Engaging Latinx students in scientific inquiry and metacognition through authentic STEM experiences
Angela Chapman*, UTRGV, USA
Uma Ganesan*, UTRGV, USA
Mario Almanza, UTRGV, USA
Lluvia Garcia, UTRGV, USA
Yailen Gomez,UTRGV, USA
Isabel Amaro, UTRGV, USA

Strand 7: Pre-service Science Teacher Education
Poster
Incorporating Place within Science Methods: Preservice Teacher Perceptions of an Outdoor Learning Experience
Steph Dean*, Clemson University, USA
Summer Landreth*, Clemson University, USA

Strand 7: Pre-service Science Teacher Education
Poster
Supporting the Teaching of Science and Engineering in Elementary and Middle Grades for Multilingual Learners
Romola Bernard*, University of North Georgia, USA
Max Vazquez Dominguez, University of North Georgia, USA

Strand 8: In-service Science Teacher Education
Poster
Investigating How a Curriculum-Based Professional Learning Community Can Support Teachers' and Researchers' Learning Processes

Kristine Wilbrecht*, University of Nevada, Reno, USA
Elizabeth de los Santos*, University of Nevada, Reno, USA
Darcy Clark, University of Nevada, Reno, USA
Jasmine Wong-Fortunato, University of Nevada, Reno, USA

Strand 8: In-service Science Teacher Education
Poster

Novelty Space, Sense of Place Social Justice Science Teaching

Gail Richmond*, Michigan State University, USA
Roberta Hunter, NJ Audubonn, USA

Strand 8: In-service Science Teacher Education
Poster

Teachers' Perspectives on the Implementation of the Scientific Inquiry and Practices Curriculum in Taiwan

YiWen Hung*, The Affiliated Senior High School of National Taiwan Normal University, Taiwan
Shiang-Yao Liu, National Taiwan Normal University, Taiwan

Strand 8: In-service Science Teacher Education
Poster

Characteristics of Elementary Teachers who Demonstrate Strong Science Content Knowledge

Alexys Skidmore*, Brigham Young University, USA
Hannah Dudley*, Brigham Young University, USA
Ryan Nixon, Brigham Young University, USA
Stefan Sorge, Leibniz Institute for Science and Mathematics Education, Germany

Strand 8: In-service Science Teacher Education
Poster

"I've got to meet students where they are": The critical care from one science teacher

Sierra Morandi*, Florida State University, USA
Sherry Southerland, Florida State University, USA

Strand 8: In-service Science Teacher Education
Poster

Problems and Possibilities: The challenges of an early career science teacher

J. Mesiner*, University of Maryland, USA

Strand 8: In-service Science Teacher Education
Poster

Early Career STEM Teachers Perceptions of Resource Quality

Shannon Navy*, Kent State University, USA
Lisa Borgerding, Kent State University, USA
Robert Idsardi, Eastern Washington University, USA
Adepeju Prince, Kent State University, USA

Strand 8: In-service Science Teacher Education
Poster

Investigating Science Teachers Epistemological Beliefs and Conceptions of Models and Modeling in Science Classrooms

Laura Chalfant*, North Carolina State University, USA
Elsun Seung, Indiana State University, USA
Soonhye Park, North Carolina State University, USA

Grace Carroll, North Carolina State University, USA
Elizabeth Kluckman,North Carolina State University, USA
William Reynolds, North Carolina State University, USA
Scott Ragan, North Carolina State University, USA
Jason Painter, North Carolina State University, USA

Strand 8: In-service Science Teacher Education
Poster
Impacts of professional learning to support teachers' design capacity for localized climate units
Lindsey Mohan, BSCS Science Learning, USA
Emily Harris, BSCS Science Learning, USA
Candice Guy-Gaytán*, BSCS Science Learning, USA
Jeffrey Snowden, BSCS Science Learning, USA

Strand 8: In-service Science Teacher Education
Poster
The Impact of Utilizing the Socioscientific Issues Approach on Teacher Satisfaction
Erin Shoop*, Saint Joseph's University, USA
Stacy Olitsky, Saint Joseph's University, USA

Strand 8: In-service Science Teacher Education
Poster
Construction of Agency by Science Teachers' Educators in the planning of a professional developmental course
Amanda Magalhães*, Universidade de São Paulo, Brazil
Daniela Scarpa*, Universidade de São Paulo, Brazil
Danusa Munford*, Universidade Federal do ABC, Brazil

Strand 8: In-service Science Teacher Education
Poster
Teachers Managing Tensions in Developing Assessments in a Professional Learning Community
JaeBin Lee*, Seoul National University, Korea, Republic of
Soo-Yean Shim, Seoul National University, Korea, Republic of

Strand 8: In-service Science Teacher Education
Poster
Exploring the Impact Mechanism of Interdisciplinary Teaching Practices among Elementary Science Teachers
Mengqian Wang*, China Research Institute for Science Popularization, China
Hong Cui, Central China Normal University, China

Strand 8: In-service Science Teacher Education
Poster
Building Teachers' Capacity for Data-Rich Instruction: Impact from a Professional Learning Course
Pai-rou Chen*, WestEd, USA
Nicole Wong*, WestEd, USA
Rasha Elsayed, WestEd, USA
Leticia Perez, WestEd, USA
Kirsten Daehler,WestEd, USA

Strand 8: In-service Science Teacher Education
Poster
Inclusive Science Education: Ethnographic Insights into Teacher Development and Classroom Diversity
Rafael Lopes*, USP, Brazil

Danusa Munford, Universidade Federal do ABC, Brazil
Daniela Scarpa, USP, Brazil

Strand 8: In-service Science Teacher Education
Poster
Early Career Science and Math Teacher Wellbeing: Self-Care Needs and Practices
Lisa Borgerding*, Kent State University, USA
Shannon Navy, Kent State University, USA
Ella Yonai, University of Georgia, USA
Elizabeth Ayano, University of Georgia, USA

Strand 8: In-service Science Teacher Education
Poster
Social Resource Access and Use for Early Career STEM Teachers
Emily Hamada*, Eastern Washington University, USA
Robert Idsardi, Eastern Washington University, USA

Strand 8: In-service Science Teacher Education
Poster
Investigating the Role of Science Practices and PCK in the Implementation of Modeling Instruction
Laura Chalfant*, North Carolina State University, USA
William Reynolds, North Carolina State University, USA
Grace Carroll, North Carolina State University, USA
Elizabeth Kluckman, North Carolina State University, USA
Soonhye Park,North Carolina State University, USA
Scott Ragan, North Carolina State University, USA
Jason Painter, North Carolina State University, USA

Strand 8: In-service Science Teacher Education
Poster
Exploring Science Teacher Leaders' Professional Growth Plans
Julianne Wenner, Clemson University, USA
Brooke Whitworth*, Clemson University, USA

Strand 8: In-service Science Teacher Education
Poster
Coherence in Professional Learning/Development: An Exploratory Study of District Science Leaders
Julie Luft*, University of Georgia, USA
Ella Yonai, University of Georgia, USA
Xinyu He, University of Georgia, USA
Paulo Carneiro Loureiro, University of Georgia, USA
Brooke Whitworth,Clemson University, USA

Strand 8: In-service Science Teacher Education
Poster
Dimensions of Teachers Pedagogical Content Knowledge (PCK) of Argumentation
Teresa Shume*, North Dakota State University, USA
Brooke Thiel, North Dakota State University, USA

Strand 10: Curriculum and Assessment Poster

Designing Socio-scientific Issues-Based Instruction Using Culturally Responsive Frameworks

Rebecca Lesnefsky*, University of North Carolina, USA
Keren Dalyot, Weizmann Institute of Science, Israel
Nannan Fan, University of North Carolina, USA
Heewoo Lee, University of North Carolina, USA
Shira Passentin,Weizmann Institute of Science, Israel
Natasha Segal, Weizmann Institute of Science, Israel
Zhen Xu, University of North Carolina, USA
David Fortus, Weizmann Institute of Science, Israel
Troy Sadler, University of North Carolina, USA

Strand 10: Curriculum and Assessment Poster

Semiconductor Education: A Scoping Review of Programs, Practices, and Challenges in Preparing the Future Workforce

Jaquelina Schmittlen-Garbocci*, University of Tennessee-Knoxville, USA
Hongyan Yang, University of Tennessee-Knoxville, USA
Rachel Wong, University of Tennessee-Knoxville, USA
Joanna Millunchick, Indiana University, USA
Shalaunda Reeves,University of Tennessee-Knoxville, USA

Strand 10: Curriculum and Assessment Poster

Exploring the inclusion of systems thinking in middle school science curricula and textbooks

Melike Hanedar*, Boğaziçi University, Turkey
Gaye Ceyhan, Boğaziçi University, Turkey

Strand 10: Curriculum and Assessment Poster

Introduction about Automated Scoring System for Descriptive Assessment and Application

Sangeui Lee*, SEOUL NATIONAL UNIVERSITY, Korea, Republic of
Minsu Ha, Seoul National University, Korea, Republic of

Strand 10: Curriculum and Assessment Poster

Incorporating Science Topics in Nontraditional Subjects: Teacher Strategies in K-12 Classrooms

Siddika Guzey*, Purdue University, USA
Emily Haluschak*, Purdue University, USA
Christine McDonnell, Purdue University, USA
Deana Lucas, Purdue University, USA
Tamara Moore,Purdue University, USA

Strand 10: Curriculum and Assessment Poster

An Approach to Unpacking NGSS Performance Expectations for Language-Diverse First Graders

Nonye Alozie, SRI International, USA
Arif Rachmatullah*, SRI International, USA
Daisy Rutstein, edCount, LLC, USA
Ron Fried, SRI International, USA

Strand 10: Curriculum and Assessment
Poster
Using Multiple Models to Learn Population-Level Viral Transmission
Zhen Xu, University of North Carolina at Chapel Hill, USA
Jamie Elsner*, University of North Carolina at Chapel Hill, USA
Eric Kirk, University of North Carolina at Chapel Hill, USA
Troy Sadler, University of North Carolina at Chapel Hill, USA
Laura Zangori,University of Missouri, USA

Strand 10: Curriculum and Assessment
Poster
Equitable Science Curriculum for Multilingual Learners: Curriculum Critique
Anna Kim*, Penn State, USA

Strand 10: Curriculum and Assessment
Poster
The impact of Place-Based Education within the framework of Next Generation Science Standards three dimensions
Heewoo Lee*, University of North Carolina at Chapel Hill, USA
Troy Sadler, University of North Carolina at Chapel Hill, USA

Strand 10: Curriculum and Assessment
Poster
Lessons Learned from Developing NGSS-Aligned Formative Assessments for 1st Graders
Arif Rachmatullah*, SRI International, USA
Nonye Alozie, SRI International, USA
Hui Yang, SRI International, USA
Daisy Rutstein, EdCount, LLC, USA
Anna Jennerjohn,SRI International, USA
Ron Fried, SRI International, USA
Marta Mielicki, SRI International, USA

Strand 11: Cultural, Social, and Gender Issues
Poster
Promoting Sociotechnical Perspectives of Engineering During a Summer Bridge Program
Jacob Pleasants*, University of Oklahoma, USA

Strand 11: Cultural, Social, and Gender Issues
Poster
'I hope this program fails miserably'': Rural resistance toward queer-focused science education research
Gary Wright*, University of Missouri, USA

Strand 11: Cultural, Social, and Gender Issues
Poster
Analysis of Genetic Determinism and Essentialism Discourses in Online Communities
Ji Eun Kim*, Seoul National University, Korea, Republic of
Sun Young Shin, Seoul National University, Korea, Republic of
Seung Ah Park, Seoul National University, Korea, Republic of
MinSu Ha, Seoul National University, Korea, Republic of

Strand 11: Cultural, Social, and Gender Issues
Poster
Rooted in Culture, Growing Equity; An African Inspired Approach to Teach Logic Gate
Olasunkanmi Gbeleyi, Lagos State University (LASU-ACEITSE), Nigeria
Peter Okebukola, Lagos State University (LASU-ACEITSE), Nigeria

Juma Shabani, University of Burundi, Burundi
Deborah Agbanimu, National Open University of Nigeria (NOUN), Nigeria
Esther Funmilayo, Lagos State University (LASU-ACEITSE), Nigeria

Strand 11: Cultural, Social, and Gender Issues
Poster
'Yes – For Us Too'': Learning in Informal Environments in a Minority Population
Tali Tal*, Technion, Israel Institute of Technology, Israel
Maha Jaramneh, Technion, Israel nstitute of Technology, Israel
Abeer Watted, Al-Qasemi Academic College of Education, Israel

Strand 11: Cultural, Social, and Gender Issues
Poster
High school makerspace experience and the gender gap in STEM identity and career interest
Chen Chen*, The University of Hong Kong, Hong Kong
Yuhan Li, The University of Hong Kong, Hong Kong
Gerhard Sonnert, Harvard-Smithsonian Center for Astrophysics, USA
Philip Sadler, Harvard-Smithsonian Center for Astrophysics, USA
Susan Sunbury,Harvard-Smithsonian Center for Astrophysics, USA
Sherry Lassiter, MIT, USA

Strand 11: Cultural, Social, and Gender Issues
Poster
Navigating with Cultural Wealth: Reframing the Narrative of Undergraduates' Journeys Toward STEM Degrees
Sheila Castro*, University of Florida, USA
Bruce Carroll, University of Florida, USA
Janice Mejia, Northwestern University, USA
Kent Crippen, University of Florida, USA

Strand 11: Cultural, Social, and Gender Issues
Poster
Exploring Associations Between Event-Based (Mis)Recognition by STEM Authorities with STEM Identity and Career Aspirations
Amdad Ahmed Awsaf*, Florida International University, USA
Remy Dou, Florida International University, USA
Gerhard Sonnert, Harvard University, USA
Philip Sadler, Harvard University, USA

Strand 11: Cultural, Social, and Gender Issues
Poster
Exploring Instructional Strategies Used to Promote Equity in Science Classrooms: A Systematic Literature Review
Elizabeth Ayano*, University of Georgia, USA
Julie Luft, University of Georgia, USA
Ella Yonai, University of Georgia, USA

Strand 11: Cultural, Social, and Gender Issues
Poster
Black STEM Students and Faculty within the Mid-Atlantic Region: A Systematic Literature Review
Zaki Hawkins*, American University, USA
Ihsan Hawkins*, American University, USA
Jess Edwards, American University, USA
Martinique Sealy, American University, USA
Shari Watkins,American University, USA
Brian McGowan, American University, USA

Strand 11: Cultural, Social, and Gender Issues
Poster
Vanquishing the Fear of Optics: Unleashing the Power of the Culturo-Techno-Contextual Approach (CTCA)
John Ogonenwe, African Center of Excellence for Innovative and Transformative STEM Education, LASU, Nigeria
Tunde Rahman, LAGOS STATE UNIVERSITY, Nigeria
Peter Okebukola*, LAGOS STATE UNIVERSITY, Nigeria
Juma Shabani, University of Burundi, Burundi
Ademola Ibukunolu,LAGOS STATE UNIVERSITY, Nigeria

Strand 11: Cultural, Social, and Gender Issues
Poster
Assessing Relational Equity in Small Groups in a STEM Learning Environment
Vanessa Figueroa Weston*, Grinnell College, USA
Paul Hutchison, Grinnell College, USA

Strand 12: Technology for Teaching, Learning, and Research
Poster
Creating engaging learning spaces for teaching Machine Learning to adolescents
Manav Sharma*, University of Miami, USA
Ji Shen*, University of Miami, USA

Strand 12: Technology for Teaching, Learning, and Research
Poster
Perceptions of Using Artificial Intelligence-Based Educational Tools
Sabrina Stanley*, University of North Alabama, USA
Hannah Howell, University of North Alabama, USA

Strand 12: Technology for Teaching, Learning, and Research
Poster
Impact of Personalized Learning Approach (UDA 1.0) on students Cognitive Proficiency in ICT
Uchenna Ugwuoke*, LASU-ACEITSE, Nigeria
Peter Okebukola, LASU-ACEITSE, Nigeria
Rahman Alade, LASU-ACEITSE, Nigeria
Rasheed Sanni, LASU-ACEITSE, Nigeria
Abdurrazaq Olawale,LASU-ACEITSE, Nigeria

Strand 12: Technology for Teaching, Learning, and Research
Poster
Curating the Future: Integrating Digital Curation for Personalized Learning in Science Education
Gal Stern, Technion - Israel Institute of Technology, Israel
Dina Tsybulsky*, Technion - Israel Institute of Technology, Israel

Strand 12: Technology for Teaching, Learning, and Research
Poster
Is AI a Viable Coder: An Exploratory Study Using ChatGPT for In Vivo Coding
Xinyu He*, University of Georgia, USA
Ella Yonai, University of Georgia, USA
Julie Luft, University of Georgia, USA
Elizabeth Ayano, University of Georgia, USA
Joseph Deluca,University of Georgia, USA
Yuxi Huang, university of California, Irvine, USA

Strand 12: Technology for Teaching, Learning, and Research
Poster
Technology enhanced collaborative argumentation and discourse in socioscientific issues
Sharfun Islam Nancy*, University of South Florida, USA

Strand 12: Technology for Teaching, Learning, and Research
Poster
Exploring Equity Maps App as a Tool to Bridge Research and Practice
Mandy Dunphy*, Baylor University, USA
Alison Warren*, University of Iowa, USA
David Nelson, Asociación Escuelas Lincoln/Founder of Equity Maps App, Argentina
Brian Hand, University of Iowa, USA

Strand 12: Technology for Teaching, Learning, and Research
Poster
Exploring LLM's Capabilities in Measuring Science PCK Using Lesson Plans and Open-ended Responses
Arif Rachmatullah*, SRI International, USA
Shaishav Tayde, SRI International, USA
Nonye Alozie, SRI International, USA
John Niekrasz, SRI International, USA
Sophia Ouyang,SRI International, USA
Marta Mielicki, SRI International, USA
Hui Yang, SRI International, USA

Strand 12: Technology for Teaching, Learning, and Research
Poster
Enhancing Conceptual Understanding of Friction Force Through Dynamic Modelling by Using the ArMo Application
Tugba Yuksel*, Recep Tayyip Erdogan University, Turkey
Ibrahim Delen, Usak University, Turkey
Bahadir Namdar, Ege University, Turkey
Ince Gokhan, Istanbul Thecnical University, Turkey

Strand 13: History, Philosophy, Sociology, and Nature of Science
Poster
How do Inservice Teachers Conceptualize the Value-laden Nature of Technology?
Jerrid Kruse*, Drake University, USA
Isaiah Kent-Schneider, Drake University, USA
Lucas Menke, Drake University, USA

Strand 13: History, Philosophy, Sociology, and Nature of Science
Poster
Tensions in Nature of Science Assessment
Sarah Voss*, Western Washington University, USA
Debi Hanuscin, Western Washington University, USA
Isaiah Kent-Schneider, Drake University, USA

Strand 13: History, Philosophy, Sociology, and Nature of Science
Poster
A comparative case study of PCK of NOS with a biology teacher teaching three content
Paola Núñez, Pontificia Universidad Católica de Valparaíso, Chile
Catalina Cañete, Pontificia Universidad Católica de Valparaíso, Chile
Carolina Parraguez*, Pontificia Universidad Católica de Valparaíso, Chile
Hernan Cofré, Pontificia Universidad Católica de Valparaíso, Chile

Strand 14: Environmental Education and Sustainability
Poster
Sustainable and healthy nutrition among young people: TPB-based study
Julia Holzer*, University of Bremen, Germany
Doris Elster, University of Bremen, Germany

Strand 14: Environmental Education and Sustainability
Poster
Exploring the long-term insights gained from a climate learning experience in an innovative museum exhibit
Benjamin Janney*, University of Utah, USA
Lynne Zummo, University of Utah, USA
Marc Whiting, University of Utah, USA
Jordan Giron, University of Utah, USA

Strand 14: Environmental Education and Sustainability
Poster
Evaluating XR Interventions in Environmental Education: A Systematic Literature Review
K. "Ren" Mendoza*, University of Nebraska at Omaha, USA
Noah Glaser, University of Missouri, USA
Jule Krüger, University of Potsdam, Germany
Mohan Yang, Texas A&M University, USA
Kimberly Moeller,University of Missouri, USA

Strand 14: Environmental Education and Sustainability
Poster
Development of Global Goals Sustainability Mindsets Instrument
Hyunju Lee*, Smithsonian Science Education Center, USA
Jackie Kolb*, Smithsonian Science Education Center, USA

Strand 14: Environmental Education and Sustainability
Poster
Surfacing Local Ecological Knowledge to Establish Needs for a Community Marine Science Conservation Initiative
Hada Herring, University of Florida, USA
Julie Brown*, University of Florida, USA
Kent Crippen, University of Florida, USA
Shae Kelliher, University of Florida Marine Animal Rescue, USA
Suzanna Mickey,University of Florida Marine Animal Rescue, USA
Michael Walsh, University of Florida Marine Animal Rescue, USA
Stefanie Gazda, Cedar Key Dolphin Project, USA

Strand 14: Environmental Education and Sustainability
Poster
A Systematic Literature Review of Ocean Literacy in Non-formal Education Initiatives
Lisa Coe*, University of Florida, USA
Hada Herring, University of Florida, USA
Julie Brown, University of Florida, USA

Strand 14: Environmental Education and Sustainability
Poster
Pre-service Teachers' Climate Emotions in a Course on Climate Change
Emily Olsen*, Penn State University, USA
Aubrey Grzywacz, Penn State University, USA

Strand 14: Environmental Education and Sustainability
Poster
Climate Denial in Media: Brazilian Students' Understandings of Uncertainty in Scientific Models
Mariana Monteiro, University of São Paulo, Brazil
Lúcia Sasseron*, University of São Paulo, Brazil

Strand 14: Environmental Education and Sustainability
Poster
Students Beliefs towards Climate Change and its Teaching
Helin Semilarski*, University of Tartu, Estonia
Helen Semilarski, University of Tartu, Estonia
Katrin Vaino, University of Tartu, Estonia
Ana Valdmann, University of Tartu, Estonia

Strand 14: Environmental Education and Sustainability
Poster
A Case Study of Leveraging Climate Change Curriculum as a means of Science Communication
Shweta Lahiri*, University of Georgia, USA
Ayça Fackler, University of Missouri, USA
Emily Miller, University of Georgia, USA
Hong Tran, Purdue University, USA
Joseph Deluca,University of Georgia, USA

JRST Editor's Dinner (Invitation Only)
24-Mar-25, 6:30 PM-8:00 PM
Location: Camellia 2

Social Event

Book Talk: Applying Machine Learning in Science Education Research: When, how, and why?
24-Mar-25, 7:00 PM-8:00 PM
Location: Annapolis 1

Social Event
Organizers
Xiaoming Zhai, University of Georgia, Athens, USA
Kent Crippen, University of Florida, USA
Presenters
Marcus Kubsch, Freie Universität Berlin, Germany
Peter Wulff, Heidelberg University of Education, Germany
Christina Krist,Stanford University, USA

Kiki and community: Choose your adventure social for LGBTQ+ folk and allies to build connections and community
24-Mar-25, 7:00 PM-8:00 PM
Location: Baltimore 1

Social Event
Organizers
Sara Porter, University of North Carolina at Greensboro, USA
Colby Tofel-Grehl, Utah State University, Logan, USA

In-Person Conference
25 March 2025

Committee Business Meetings
25-Mar-25, 7:00 AM-8:00 AM

Membership Committee Meeting
Location: Annapolis 1

Program Committee Meeting
Location: Annapolis 2

Research Committee Meeting
Location: Annapolis 3

Social Media, Website & Communications Committee Meeting
Location: Baltimore 1

Awards Committee Meeting
Location: Baltimore 2

Elections Committee Meeting
Location: Baltimore 3

Equity and Ethics Committee Meeting
Location: Baltimore 4

Professional Learning and Institutes Committee Meeting
25-Mar-25, 7:00 AM-8:00 AM
Location: Baltimore 5

Graduate Student Committee Meeting
Location: Magnolia 1

International Committee Meeting
Location: Magnolia 2

Scholarships Committee Meeting
Location: Magnolia 3

Advancing Connections Between Research and Practice: JRST Research Worth Reading Recognition
25-Mar-25, 8:15 AM-9:45 AM
Location: Magnolia 3

Administrative Session
Organizers
Tina Voss, University of Nevada, USA
Marcus Kubsch, Freie University-Berlin, Germany
Cesar Delgado, North Carolina State University, USA
Carla Zembal-Saul, Penn State University, USA
Shiang-Yao Liu,National Taiwan Normal University, Taiwan

Exploring Connections Between Self and Science

Strand 2: Science Learning: Contexts, Characteristics and Interactions
25-Mar-25, 8:15 AM-9:45 AM
Location: Annapolis 1

Stand-Alone Paper
Student Success Stories in Urban Science Education: Exploring Science as Refuge
Kristina Salciccioli*, University of Toronto, Canada
Erminia Pedretti, University of Toronto, Canada

Stand-Alone Paper
Investigating the relationships between students perspectives of future consequences and interest in a STEM career
Nespolino Antonietta, University Federico II, Italy
Silvia Galano, University Federico II, Italy
Italo Testa*, University Federico II, Italy

Stand-Alone Paper
Expanding Elementary STEM Education Through Teacher-Researcher Complementarity: A Rural STEM Education Research Case Study
Christine McGrail, University of North Dakota, USA
Kendi Loy, Northwood Schools, USA

Stand-Alone Paper
Examining Black Girls' Experiences in STEM: A Systematic Literature Review
Olayinka Mohorn*, University of Memphis, USA
Alexis Riley*, New York University, USA
Demetrice Smith-Mutegi*, Old Dominion University, USA
Monica Miles, University at Buffalo-SUNY, USA
Joi Merritt,James Madison University, USA

Using data to foster deeper learning with consideration for the human elements that influence teaching practices

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
25-Mar-25, 8:15 AM-9:45 AM
Location: Baltimore 4

Stand-Alone Paper
The role of Representations in supporting evaluating Measurement Data
Stephen Mayer*, Humboldt-Universität zu Berlin, Germany
Burkhard Priemer, Humboldt-Universität zu Berlin, Germany

Stand-Alone Paper
Measurement Uncertainties in Secondary Education: when can the topic be introduced?
Karel Kok*, Humboldt-Universität, Germany
Burkhard Priemer, Humboldt-Universität, Germany

Stand-Alone Paper
Enhancing Explanation Quality in Science Education: The Impact of Content-Based and Structural Interventions
Franziska Hagos*, Humboldt-Universität zu Berlin, Germany
Steffen Wagner, Humboldt-Universität zu Berlin, Germany

Burkhard Priemer, Humboldt-Universität zu Berlin, Germany

Stand-Alone Paper

A Humanistic Stance in Looking at Teacher Experiences with Data Investigations of Extreme Weather

Asli Sezen-Barrie*, University of California Irvine, USA
Josephine Louie, EDC, USA
Emily Fagan, EDC, USA
Kevin Waterman, EDC, USA
Pam Buffington,EDC, USA
Deb Morrison, Clear Environmental, USA
Brian Fitzgerald, Mount Washington Observatory, USA

Applying a Knowledge-in-Pieces Perspective to Biology Education Research

Strand 5: College Science Teaching and Learning (Grades 13-20)
25-Mar-25, 8:15 AM-9:45 AM
Location: Annapolis 2

Symposium

Applying a Knowledge-in-Pieces Perspective to Biology Education Research

Julia Svoboda*, Tufts University, USA
Adrian Adams, University of Utah, USA
Molly Bolger Bolger, University of Georgia, USA
Jennifer Doherty, Michigan State University, USA
Paula Lemons,University of Georgia, USA
Matthew Lira, University of Iowa, USA
Rachel Dowdy, University of Georgia, USA
Philimon Zaagbil, University of Georgia, USA
Sugat Dabholkar, Tufts University, USA
Eric Kusi, University of Georgia, USA

Addressing Science Literacy in Informal Spaces

Strand 6: Science Learning in Informal Contexts
25-Mar-25, 8:15 AM-9:45 AM
Location: Magnolia 2

Stand-Alone Paper

The Importance of Science Education, Scientific Knowledge, and Evaluation Strategies for Detection of COVID-19 Misinformation

Ayelet Baram-Tsabari*, Technion - Israel Institute of Technology, Israel
Shakked Dabran-Zivan, Technion - Israel Institute of Technology, Israel

Stand-Alone Paper

Improving Elementary Students' Knowledge and Perceived Utility Value of Earth Science through Informal Science Education

Kim Cheek*, University of North Florida, USA
Elizabeth Broth, University of North Florida, USA
Tamara Reeves, University of North Florida, USA
Ryan Shamet, University of North Florida, USA

Exploring Socioscientific Issues in Preservice Teacher Education

Strand 7: Pre-service Science Teacher Education
25-Mar-25, 8:15 AM-9:45 AM
Location: Baltimore 2

Stand-Alone Paper
Socioscientific Issues: Perceptions of Elementary Pre-service Teachers in an Undergraduate Science Methods Course
Stephanie Arthur*, University of South Florida, USA
Ly Do, University of South Florida, USA
Melanie Kinskey, Texas A&M University, USA

Stand-Alone Paper
Change in Teachers SSI Teaching Beliefs Through SSI Based Instruction
Özgül Yılmaz Tüzün*, METU, Turkey
Ece Kılaç, METU, Turkey

Stand-Alone Paper
Teacher Profiles Emerging from Curriculum Design Through SSI Based Instruction
Ece Kılaç*, METU, Turkey
Özgül Yılmaz Tüzün, METU, Turkey

Grappling with Critical Problems of Practice within our Diverse Informal Elementary Science Teacher Education Community

Strand 7: Pre-service Science Teacher Education
25-Mar-25, 8:15 AM-9:45 AM
Location: Woodrow Wilson Ballroom

Symposium
Grappling with Critical Problems of Practice within our Diverse Informal Elementary Science Teacher Education Community
Christina Schwarz*, Michigan State University, USA
Amber Bismack, Oakland University, USA
Jessica Bautista, University of Michigan, USA
Martha Canipe, Northern Arizona University, USA
Kristin Gunckel,University of Arizona, USA
James Hancock II, Alma College, USA
Amal Ibourk, Florida State University, USA
Kathryn Lanouette, William & Mary, USA
TJ McKenna, Boston University, USA
Meenakshi Sharma, Mercer University, USA

Supporting and Exploring Equitable Teaching practices

Strand 7: Pre-service Science Teacher Education
25-Mar-25, 8:15 AM-9:45 AM
Location: Baltimore 1

Stand-Alone Paper
The Impact of an Early Field Experience on Mathematics and Science Teachers' Culturally Affirming Practices
Meredith Kier*, William & Mary, USA

Lindy Johnson, William & Mary, USA

Stand-Alone Paper

The Role of Epistemic Vexations in the Learning of Preservice Science Teachers About Responsive Teaching

Ruveyde Kaya, Florida State University, USA
Sherry Southerland*, Florida State University, USA

Stand-Alone Paper

A Call for Collective Practices and Tool Development to Support Culturally Ambitious Science Teaching

Matthew Kloser*, University of Notre Dame, USA
Heather Johnson, Vanderbilt University, USA
Kirsten Mawyer*, University of Hawaii at Manoa, USA
Scott McDonald*, Penn State University, USA
David Stroupe*,University of Utah, USA

Advancing Inclusive and Equitable Science Education Practices

Strand 8: In-service Science Teacher Education
25-Mar-25, 8:15 AM-9:45 AM
Location: Annapolis 3

Stand-Alone Paper

Practitioners' perspectives on inclusive science education

Laura Pannullo*, University Bielefeld, Germany
Melanie Basten, University Bielefeld, Germany
Laura Ferreira Gonzáles, University of Cologne, Germany
Felix Pawlak, University of Tübingen, Germany
Bianka Wartig,University Bielefeld, Germany
Lisa Stinken-Rösner, University Bielefeld, Germany

Stand-Alone Paper

Centering Curricular Customizations on an Equity Goal to Support Science Teachers' Beliefs about Equitable Sensemaking

Maria Moreno Vera*, Boston College, USA
Austin Moore, Boston College, USA
Katherine McNeill, Boston College, USA
Renee Affolter, OpenSciEd, USA
Samuel Lee,California State University, Long Beach, USA

Stand-Alone Paper

Science Meets Democracy: Do Teachers Vote 'Yes' on Democratic Teaching

Heba EL-Deghaidy*, American University in Cairo, Egypt

Stand-Alone Paper

Leveraging emancipatory pedagogies to support science teachers of color through a Noyce teaching fellowship

Vanessa Louis*, University of Michigan, USA
Natalie King*, Georgia State University, USA

Discussing the Impacts of Recent Policies on Science Education and Prospects for a More Resilient Infrastructure for How Research Can Support a More Just Education System

25-Mar-25, 8:15 AM-9:45 AM
Location: Camellia 1

Discussion Session

Organizers

Terrell Morton, University of Illinois, Chicago, USA
William Penuel, University of Colorado, USA

Initial Results from an Iterative Program Design for Educating Science Education Leaders

Strand 8: In-service Science Teacher Education
25-Mar-25, 8:15 AM-9:45 AM
Location: Camellia 2

Related Paper Set

Designing a Program for Science Education Teacher-Leaders

Elizabeth Lewis*, University of Nebraska-Lincoln, USA
Wendy Smtih, University of Nebraska-Lincoln, USA
Dan Claes, University of Nebraska-Lincoln, USA
David Harwood, University of Nebraska-Lincoln, USA
Dawn Jarmillo,RMC Research Corporation, USA
Gina Matkin, University of Nebraska-Lincoln, USA
LJ McElravy, University of Nebraska-Lincoln, USA

Related Paper Set

Changes in MTFs Understanding about Science Education Leadership

Rachel Benzoni*, University of Nebraska-Lincoln, USA
Gina Matkin, University of Nebraska-Lincoln, USA
Wendy Smith, University of Nebraska-Lincoln, USA
Elizabeth Hasseler, University of Nebraska-Lincoln, USA
LJ McElravy,University of Nebraska-Lincoln, USA

Related Paper Set

MTFs Discipline-specific Science Subject Matter Knowledge and Pursuing National Board Certification

Elizabeth Hasseler*, University of Nebraska-Lincoln, USA
Rachel Benzoni*, University of Nebraska-Lincoln, USA
Dan Claes, University of Nebraska-Lincoln, USA
David Harwood, University of Nebraska-Lincoln, USA
Elizabeth Lewis*,University of Nebraska-Lincoln, USA

Related Paper Set

The Thread of Equity Throughout a Noyce MTF Program

Gina Matkin, University of Nebraska-Lincoln, USA
Rachel Benzoni*, University of Nebraska-Lincoln, USA
Elizabeth Lewis*, University of Nebraska-Lincoln, USA
Elizabeth Hasseler*, University of Nebraska-Lincoln, USA

Building Scientific Literacy and Socio-Scientific Reasoning in Diverse Contexts

Strand 10: Curriculum and Assessment
25-Mar-25, 8:15 AM-9:45 AM
Location: Magnolia 1

Stand-Alone Paper

Exploring Gaps in Socio-scientific Reasoning Skills: Insights from Students in Grades 5-7

Yidi Wu, Beijing Normal University, China
Yangdan Liu*, Beijing Normal University, China
Jing Lin*, Beijing Normal University, China
Ling Liang*, La Salle University, USA
Xiufeng Liu*,University of Macau, China

Stand-Alone Paper

Evaluating Singapore Secondary Students' Grasp of Scientific Practices

Yann Shiou Ong*, National Institute of Education, Nanyang Technological University, Singapore
Yew-Jin Lee, National Institute of Education, Nanyang Technological University, Singapore
Miechie Leowardy, National Institute of Education, Nanyang Technological University, Singapore

Stand-Alone Paper

Developing an SSI-based STEAM in promoting the development of students scientific literacy and agency

Ha My Anna Mang*, Macquarie Univeristy, Australia
Hye Eun Chu*, Macquarie Univeristy, Australia
Sonya Martin, Seoul National Univeristy, Korea, Republic of

Stand-Alone Paper

Analysis of NGSS Alignment in Wildfire Science Curricula: Using Natural Disasters as Anchoring Phenomena

Spencer Eusden*, University of Nevada, Reno, USA
Li Ke, University of Nevada, Reno, USA

Fostering Cultural Responsiveness and Social Justice among Science/STEM Teachers

Strand 11: Cultural, Social, and Gender Issues
25-Mar-25, 8:15 AM-9:45 AM
Location: Azalea 1

Stand-Alone Paper

Enacting Culturally Responsive Science Education in Rural Urban Districts: Noyce Alumni Perspectives From Two Universities

Dominic Fantacone*, SUNY Cortland, USA
Elizabeth Edmondson*, Virginia Commonwealth University, USA
Aimee Ellington, Virginia Commonwealth University, USA
Sean Nolan, SUNY Cortland, USA

Stand-Alone Paper

Cultural heritage in steam teacher professional development in Nepal

Bhaskar Upadhyay*, University of Minnesota, USA
Lindsey Smaka, University of Minnesota, USA
Samantha Barragan, University of Minnesota, USA

Stand-Alone Paper
Developing Science Equity Ambassadors to Tackle Inequities in Science/STEM Education
Tara Nkrumah*, Arizona State University, USA

Stand-Alone Paper
More Than Buzz Words: Teachers' motivations, understandings, and evolution in teaching science for social justice
Katherine Wade-Jaimes*, University of Nevada, USA
Maizie Dyess, University of Nevada, USA
Burak Sahin, University of Nevada, USA

Stand-Alone Paper
Pre-Service Elementary Teacher's Perspectives of Teaching Science Equitably
Joi Merritt*, James Madison University, USA
Angela Webb, James Madison University, USA

Teachers' Perception and Practice in Digital Era

Strand 12: Technology for Teaching, Learning, and Research
25-Mar-25, 8:15 AM-9:45 AM
Location: Baltimore 5

Stand-Alone Paper
Innovative Hybrid Science Education: Integrating Citizen Science and Digital Learning for Future-Ready Teachers
Selçuk Kılınç*, Middle East Technical University, Turkey
Gökhan Öztürk, Middle East Technical Universiry, Turkey

Stand-Alone Paper
Examining the Role of Human Actors within Elementary Science Digital Teaching Simulations
Jamie Mikeska*, ETS, USA
Shreyashi Halder, ETS, USA
Devon Kinsey, ETS, USA
Pamela Lottero-Perdue, Towson University, USA

Stand-Alone Paper
ChatGPT versus humans: teacher selection considerations when choosing student cluster characterization in chemistry
Shelley Rap*, Weizmann Institute of Science, Israel
Elad Yacobson, Weizmann Institute of Science, Israel
Giora Alexandron, Weizmann Institute of Science, Israel
Ron Blonder, Weizmann Institute of Science, Israel

Nature of Science in Science Curriculum and Teacher Education: A Global Perspective

Strand 13: History, Philosophy, Sociology, and Nature of Science
25-Mar-25, 8:15 AM-9:45 AM
Location: Annapolis 4

Symposium
Nature of Science in Science Curriculum and Teacher Education: A Global Perspective
Wonyong Park*, University of Southampton, United Kingdom
Ryan Summers*, University of North Dakota, USA

Jacob Pleasants*, University of Oklahoma, USA
Richard Brock*, King's College London, United Kingdom
Tetsuo Isozaki*,Hiroshima University, Japan
Dina Tsybulsky*, Technion - Israel Institute of Technology, Israel
Anna Pshenichny-Mamo, Technion - Israel Institute of Technology, Israel
Haya Ben Simon*, Technion - Israel Institute of Technology, Israel
Ferah Özer, Koc University, Turkey
Çiğdem Han-Tosunoğlu, Marmara University, Turkey
Radu Bogdan Toma, University of Burgos, Spain
Olivia Levrini, University of Bologna, Italy
Martina Caramaschi, University of Bologna, Italy
Sara Satanassi, University of Bologna, Italy
Kerstin Kremer, Justus Liebig University Giessen,
Elvira Schmidt, Justus Liebig University Giessen, Germany
Ivã Gurgel, University of São Paulo,
Maurício Pietrocola, University of São Paulo,

Fostering authentic engagement: Strategies for partnered climate change education across the science education landscape

Strand 14: Environmental Education and Sustainability
25-Mar-25, 8:15 AM-9:45 AM
Location: Baltimore 3

Symposium
Fostering authentic engagement: Strategies for partnered climate change education across the science education landscape

Heidi Cian, Maine Mathematics and Science Alliance, USA
Michelle Brown, Florida International University, USA
Julie Luft*, University of Georgia, USA
Joseph DeLuca, University of Georgia, USA
Emily Miller,University of Georgia, USA
Steven Fletcher, St. Edwards University, USA
Remy Dou, Florida International University, USA
Tali Tal, Technion Israel Institute of Technology, Israel
Hong Tran, Purdue University, USA
Shweta Lahiri, University of Georgia, USA

A Celebration of Distinguished Contribution through Research Award Recipients: A Discussion of the Future of Science Education

25-Mar-25, 10:00 AM-11:30 AM
Location: Azalea 2

Administrative Session
Organizer
Amelia Gotwals, Michigan State University, East Lansing, USA
Panelist
Mei-Hung Chiu, National Taiwan Normal University, Taiwan

Roundtables 2

25-Mar-25, 10:00 AM-11:30 AM
Location: Woodrow Wilson Ballroom

Strand 2: Science Learning: Contexts, Characteristics and Interactions
WIP Roundtable
Empowering Teachers as Co-Researchers: The implementation of a

community-based research project with High School Students
Sarah Fankhauser*, Oxford College of Emory University, USA
Susan Watts-Taffe, University of Cincinnati, USA
Jonathan Breiner, University of Cincinnati, USA
Nicholas Shaver, University of Cincinnati, USA

Strand 2: Science Learning: Contexts, Characteristics and Interactions
WIP Roundtable
Negotiation within Argumentation – Guiding Student Discourse
Carla McAuliffe*, IGES, USA
Donna Governor, UNG, USA
Lorraine Ramirez Villain, UNG, USA

Strand 1: Science Learning: Development of student understanding
WIP Roundtable
From Waste to Wisdom: The Role of Active Student Sensemaking in Addressing Complex Problem Course
Peter Locher*, American University, USA
Makennah Troy, American University, USA
Sarah Irvine Belson, American University, USA

Strand 2: Science Learning: Contexts, Characteristics and Interactions
WIP Roundtable
Minimizing the Academic Achievement Gap Between Advantaged and Disadvantaged Students in Denmark, Norway, and Sweden
Patricia Patrick*, Columbus State University, USA
Daniel Purvis*, Columbus State University, USA

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
WIP Roundtable
Identifying Arts Integration in Science Scope (2019 to 2023) with Science Arts Integration Awareness Model
Patricia Patrick*, Columbus State University, USA
Kendel Purvis*, Columbus State University, USA

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
WIP Roundtable
Educators' Perspectives on Integrating Data Science/Water into STEM, Physical Education and Literacy Curriculum.
Anne Degnan*, Columbia University, USA
Laureline Josset, Columbia University, USA

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
WIP Roundtable
Environmental Injustices and Their Role as Hyper-local Phenomenon in High School Classrooms
Justin McFadden*, University of Louisville, USA
Linda Fuselier, University of Louisville, USA

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
Roundtable
Differences between students and teachers in the perceived relevance of a localized climate change unit
Candice Guy-Gaytán*, BSCS Science Learning, USA

Jeffrey Snowden, BSCS Science Learning, USA
Lindsey Mohan, BSCS Science Learning, USA
Emily Harris, BSCS Science Learning, USA

Strand 7: Pre-service Science Teacher Education
Roundtable
Indonesian Preservice Science Teacher's Learning of Integrated STEM Teacher Identity: Single Case Study
Anjar Putro Utomo*, University of Minnesota, USA
Gillian Roehrig, University of Minnesota, USA

Strand 7: Pre-service Science Teacher Education
Roundtable
Examining the Intersection of Culture and Positional Identities on an Elementary Preservice Teacher's Identity Development
Jenna Gist*, Purdue University, USA
Jeffrey Radloff*, State University of New York- Cortland, USA
Brenda Capobianco, Purdue University, USA

Strand 7: Pre-service Science Teacher Education
Roundtable
STEM Teacher Persistence: Teacher Preparation Programs that Support Identity and Belonging
Danielle Sodani*, American University, USA
Peter Locher, American University, USA
Sarah Irvine Belson, American University, USA
Carolyn Parker, American University, USA
Shari Watkins,American University, USA
Kiho Kim, American University, USA

Strand 8: In-service Science Teacher Education
WIP Roundtable
Lichen Our Way to Better Data Literacy: Insights from a Place-Based and Bayesian Professional Development
Amanda Garner*, University of Tennessee, USA
Joshua Rosenberg, University of Tennessee, USA

Strand 8: In-service Science Teacher Education
WIP Roundtable
Exploring Teacher Professional Development for Civic Science Education in Middle Grades
Maggie Demarse*, Michigan State University, USA

Strand 8: In-service Science Teacher Education
WIP Roundtable
Mechanisms of Professional Learning for 3D Science Teaching in Rural Schools
Rebecca Sansom*, Texas A&M University, USA
Michelle Hudson, Brigham Young University, USA
Heather Leary, Brigham Young University, USA
Clara Smith, Brigham Young University, USA
Max Longhurst,Utah State University, USA
Josh Stowers, Brigham Young University, USA

Strand 8: In-service Science Teacher Education
WIP Roundtable
Empowering In-Service Middle School Teachers to Integrate Quantum

Science: A Design-Based Approach to K-12 Curriculum
Zeynep Akdemir-Beveridge*, University of Connecticut, USA
Muhsin Menekse, Purdue University, USA

Strand 8: In-service Science Teacher Education
Roundtable
Exploring a teacher-researcher collaboration: the inside-out of the social phenomenon
Maiza de Albuquerque Trigo*, University of Luxembourg, Luxembourg
Thierry Frentz*, Ministry of Education, Luxembourg

Strand 11: Cultural, Social, and Gender Issues
Roundtable
Motherhood in academia: An autoethnography examining motherly guilt
Andrea Phillips*, Indiana University, USA
Claire Cesljarev, Indiana University, USA

Strand 11: Cultural, Social, and Gender Issues
Roundtable
Mapping Gender Dynamics in STEM: A scoping review of the MENA region
Aya Elkholy, Elite International School, Egypt
Heba EL-Deghaidy*, American University in Cairo, Egypt
Zahra almasabi, Najran University, Saudi Arabia

Strand 11: Cultural, Social, and Gender Issues
Roundtable
The Use of Science-Related Cultural Capital among Latina Engineers
Emily Tancredi-Brice Agbenyega*, LaGuardia Community Collge, USA

Strand 11: Cultural, Social, and Gender Issues
WIP Roundtable
Gendered experiences of impostor phenomenon: A qualitative study in STEM.
Devasmita Chakraverty*, Indian Institute of Management Ahmedabad, India

Strand 11: Cultural, Social, and Gender Issues
WIP Roundtable
Including Families as a Way to Expand STEM Identity Research
Marisa Peczuh*, University of Minnesota, USA
Keisha Varma, University of Minnesota, USA

Strand 12: Technology for Teaching, Learning, and Research
Roundtable
Exploring Middle Schoolers' Learning in an AI-Integrated Paleontology Camp through Individual and Group ZPD
Chih Hsuan Lin*, University of Florida, USA
Tonika Jones, University of Florida, USA
Ray Opoku, University of Florida, USA
Gabriella Haire, University of Florida, USA
Christine Wusylko*,University of Florida, USA
Nazanin Adhami*, University of Florida, USA
Bruce MacFadden, University of Florida, USA
Victor Perez, St. Mary's College of Maryland, USA
Brian Abramowitz, University of Florida, USA
Pavlo Antonenko, University of Florida, USA

Strand 12: Technology for Teaching, Learning, and Research
Roundtable
Optimizing Deep Learning Frameworks and Large Language Models for Automated Science Classroom Discourse Analysis
Soon Lee*, Kennesaw State University, USA

Strand 12: Technology for Teaching, Learning, and Research
Roundtable
Bridging Gaps in Science Education: AI-Driven Personalized Learning and Equity
Taesoo An*, Seoul National University, Korea, Republic of
Sonya Martin, Seoul National University, Korea, Republic of

Strand 12: Technology for Teaching, Learning, and Research
Roundtable
Preservice teachers' perceptions of utilizing AI in science education with a focus on human-centered approaches
Soo Won Shim*, Illinois State University, USA
Jeongae Kang, Illinois State University, USA
Do-Yong Park, Illinois State University, USA

Strand 12: Technology for Teaching, Learning, and Research
Roundtable
Generative AI in Science Teacher Education
Stephanie Arthur*, University of South Florida, USA
Yvonne Franco, University of Tampa, USA
Zafer Unal, University of South Florida, USA

Strand 5: College Science Teaching and Learning (Grades 13-20)
WIP Roundtable
Investigation of the Inter-Rater Reliability between ChatGPT-4o and Human Raters in Qualitative Analysis.
Nikhil Borse*, Purdue University, USA
Ravishankar Chatta Subramaniam, Purdue University, USA
N. Sanjay Rebello, Purdue University, USA

Strand 14: Environmental Education and Sustainability
WIP Roundtable
Culturally-Relevant Field Ecology: Wildfire Mitigation and Social-Ecological Systems Resilience in Maui, Hawai'i
Jadda Miller*, University of California, Davis, USA
Heidi Ballard, University of California, Davis, USA
Cassie Kepler, Kihei Charter School, USA

Strand 14: Environmental Education and Sustainability
Roundtable
Transformative learning experience: Measurable outcome of a place-based environmental justice-oriented geoscience curriculum
Shondricka Burrell*, Morgan State University, USA
Keshiyena Pieters, Morgan State University, USA

Strand 14: Environmental Education and Sustainability
WIP Roundtable
Development of an instrument to measure grade 7 students' climate change knowledge and GIS skills

Marie Johanna Univer*, University of Tartu, Estonia
Regina Soobard, University of Tartu, Estonia
Birgit Viru, University of Tartu, Estonia

Strand 14: Environmental Education and Sustainability
Roundtable
Needs Assessment for Leveraging Participatory Science to Enhance Participation in Conservation in the Amazon
MARTHA SIMON-PARDO*, UNIVERSITY OF FLORIDA, USA
JULIE BROWN*, UNIVERSITY OF FLORIDA, USA

Strand 13: History, Philosophy, Sociology, and Nature of Science
Roundtable
How Expressed Distrust in Scientists Impacts Individual Behavior
Ava Breitbeck*, Syracuse University, USA

Understanding How Learners Seek Coherence in Science

Strand 1: Science Learning: Development of student understanding
25-Mar-25, 10:00 AM-11:30 AM
Location: Annapolis 2

Symposium
Symposium: Understanding How Learners Seek Coherence in Science
Engin Bumbacher, Haute École Pédagogique Vaud, Switzerland
Benjamin Geller, Swarthmore College, USA
Katherine Gifford, University of Illinois Urbana-Champaign, USA
Karen Hammerness, American Museum of Natural History, USA
Eric Kuo,University of Illinois Urbana-Champaign, USA
Caroline Long, University of Washington, USA
Kavita Matsko, Northwestern University, USA
Mary Short, Smithsonian Science Education Center, USA
Tiffany-Rose Sikorski, The George Washington University, USA
David Stroupe, University of Utah, USA
Daniel Levin, University of Maryland, College Park, USA

Empowering Science Educators: Support Systems, Mentorship, and Professional Development Strategies

Strand 2: Science Learning: Contexts, Characteristics and Interactions
25-Mar-25, 10:00 AM-11:30 AM
Location: Annapolis 1

Stand-Alone Paper
Harnessing Personal Storytelling to Support Teachers' Initial Grasp of Understanding Computational Thinking
Khusbu Dalal*, University of Maryland, USA
Jennifer Radoff, University of Maryland, USA
Andrew Elby, University of Maryland, USA
Amy Green, University of Maryland, USA

Stand-Alone Paper
Catalyst for Change: Validating a Support-Seeking Instrument for Science Teachers
Mayra Marquez-Mendez*, University of Nevada Las Vegas, USA
Tina Vo, University of Nevada Las Vegas, USA
Adjoa Mensah, University of Nevada Las Vegas, USA

Stand-Alone Paper
Prioritizing Expectations Through Professional Development on Mentorship for Physics Undergraduate Research
Heather McCall*, University of Kentucky, USA
Cameron Richards*, University of Kentucky, USA
Jennifer Wilhelm, University of Kentucky, USA

Stand-Alone Paper
Working towards a Rightful Presence for minoritized teacher, student and parent in middle school engineering
Virginia Swindell*, University of North Carolina at Greensboro, USA
Edna Tan, University of North Carolina at Greensboro, USA

Integrating cultural relevance and social justice to improve learning outcomes and promote inclusivity

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
25-Mar-25, 10:00 AM-11:30 AM
Location: Baltimore 4

Stand-Alone Paper
Teacher Perceptions of Enacting a Lesson Woven with Choctaw Culture and Place
Stephanie Hathcock*, Oklahoma State University, USA
Juliana Utley, Oklahoma State University, USA
Kathryn Gardner-Vandy, Oklahoma State University, USA
Sarah McDowell, Maryville College, USA
Angela Just,Oklahoma State University, USA
Kirtika Panwar, Oklahoma State University, USA

Stand-Alone Paper
Breaking Down Barriers: Effects of Culturo-Techno-Contextual Approach on Learning Difficult Computer Studies Concepts
Esther Peter, Africa Centre of Excellence for Innovative and Transformative STEM Education, Lagos State University, Nigeria
David Peter, Lagos State University, Nigeria
Peter Okebukola, Lagos State University, Nigeria
Deborah Agbanimu, National Open University, Nigeria
Franklin Onowugbeda, Lagos State University, Nigeria
Adekunle Oladejo, Lagos State University, Nigeria
Olasunkanmi Gbeleyi, Lagos State University, Nigeria

Collaboration and Interdisciplinary Research

Strand 5: College Science Teaching and Learning (Grades 13-20)
25-Mar-25, 10:00 AM-11:30 AM
Location: Magnolia 3

Stand-Alone Paper
Developing future leaders: Interdisciplinary and professional training for graduate students in Food-Energy-Water (FEW) systems
Suhana Chattopadhyay*, University of Maryland, USA
Katya Murillo, University of Maryland, USA
Gili Ad-Marbach*, University of Maryland, USA

Amy Sapkota, University of Maryland, USA

Stand-Alone Paper

Experiences of Collaboration Difficulties in University STEM Laboratories: A Phenomenological Study

Sun Young Shin*, Seoul National University, Korea, Republic of
Seung Ah Park, Seoul National University, Korea, Republic of
Minsu Ha, Seoul National University, Korea, Republic of

Stand-Alone Paper

Students' Ideas about Convergence Research in a Complex Problems Course on Wasted Food

Alicia DeBruin, American University, USA
Hannah Jardine*, American University, USA

Stand-Alone Paper

'My field is packed full of jargon.'' How Graduate Students Navigate a Convergence Research Center

Kathleen Bordewieck*, North Carolina State University, USA
M. Gail Jones, North Carolina State University, USA

Building Youths' STEM Identity through Informal Science Experiences

Strand 6: Science Learning in Informal Contexts
25-Mar-25, 10:00 AM-11:30 AM
Location: Magnolia 2

Stand-Alone Paper

The social networks of historically marginalized youth and how they contribute to their STEM pathways.

Preeti Gupta*, American Museum of Natural History, USA
Peter Bjorklund, University of California San Diego, USA
Rachel Chaffee*, American Museum of Natural History, USA
Anna Macpherson*, American Museum of Natural History, USA
Mahmoud Abouelkheir*,American Museum of Natural History, USA
Coral Braverman, American Museum of Natural History, USA
Jahneal Francis, American Museum of Natural History, USA
Lois Wu, American Museum of Natural History, USA
Lucie Lagodich, American Museum of Natural History, USA
Priya Hinton, American Museum of Natural History, USA

Stand-Alone Paper

Problem-Solving in the Missouri Ozarks: Case Studies in Informal Education to Promote Science Interest

Katherine Sharp*, Missouri University of Science and Technology, USA
Beth Kania-Gosche, Missouri University of Science and Technology, USA
Carly Carron, Missouri University of Science and Technology, USA

Stand-Alone Paper
Fostering Belonging in a STEM Academic Community of Practice through a Summer Research Internship
Alexandria Muller*, University of California, Santa Barbara, USA
Jeanice Trat, University of California, Santa Barbara, USA
Wendy Ibsen, University of California, Santa Barbara, USA

Stand-Alone Paper
Belonging and Connections: A Network Analysis of High School Students in a Science-Centered College-Readiness Program
Rachelle Pedersen*, Texas Tech University, USA
Emily Sparago*, Boston University School of Medicine, USA
Cindy Kern*, Quinnipiac University, USA

Research in Approaches to STEM Teacher preparation

Strand 7: Pre-service Science Teacher Education
25-Mar-25, 10:00 AM-11:30 AM
Location: Baltimore 2

Stand-Alone Paper
Overcoming Barriers in Interdisciplinary Education: Exploring Pre-Service Teachers' Perceptions
Niklas Kramer*, Bielefeld University, Germany
Claas Wegner, Bielefeld University, Germany

Stand-Alone Paper
Innovating Science Education: The Impact of Situated Learning on Preservice Teachers' Implementation of Engineering Design
John Ojeogwu*, Texas State Univeristy, USA
Frackson Mumba, University of Virginia, USA

Stand-Alone Paper
Elementary Preservice Teachers' Views of Investigations: A Pre/post Comparison from a Science Content Course
Ashley Thomas, Kennesaw State University, USA
Rasheda Likely, Kennesaw State University, USA
Preethi Titu, Kennesaw State University, USA
Anna Arias, Kennesaw State University, USA
Jessica Stephenson Reaves,Kennesaw State University, USA
Soon Lee, Kennesaw State University, USA

Shaping Teacher Dispositions: Insights from Preservice Learning Experiences

Strand 7: Pre-service Science Teacher Education
25-Mar-25, 10:00 AM-11:30 AM
Location: Baltimore 1

Stand-Alone Paper
Elementary Pre-service Teachers' Responsiveness When Facilitating Simulated Scientific Argumentation Discussions: Before and After an Intervention

Shreyashi Halder*, ETS, USA
Jamie Mikeska, ETS, USA
Devon Kinsey, ETS, USA
Pamela Lottero-Perdue, Towson University, USA
Pavneet Bharaj,California State University Bakersfield, USA

Stand-Alone Paper

Connections between collective, personal, and enacted pedagogical content knowledge in a pre-service chemistry teacher program

Luciane Goes, Federal University of Sao Carlos, Brazil
Carmen Fernandez*, University of Sao Paulo, Brazil

Stand-Alone Paper

Learning Dispositions of Pre-Service Biology Teachers and Undergraduate Biology Students regarding Animal Experimentation in Research

Jacqueline Dischereit*, Georg-August-University, Germany
Susanne Bögeholz, Georg-August-University, Germany

Stand-Alone Paper

How a Course Exploring AI Tools Influences Pre-service Teacher's Perceptions of AI

Kerry Bartlett*, University of North Carolina at Chapel Hill, USA
Janice Anderson, University of North Carolina at Chapel Hill, USA

Challenges and Resilience in Early Career Science Teacher Retention

Strand 8: In-service Science Teacher Education
25-Mar-25, 10:00 AM-11:30 AM
Location: Camellia 2

Stand-Alone Paper

Newly Hired Science Teachers Cultivating Resilience: Proximal Assessments and Distal Reflections

Jose Pavez*, Western Illinois University, USA
Ella Yonai, University of Georgia, USA
Shannon Navy, Kent State University, USA
Julie Luft, University of Georgia, USA
Adepeju Prince,University of Georgia, USA
Lisa Borgerding, Kent State University, USA
Robert Idsardi, Eastern Washington University, USA

Challenges and Resilience in Early Career Science Teacher Retention

Strand 8: In-service Science Teacher Education
25-Mar-25, 10:00 AM-11:30 AM
Location: Camellia 2

Stand-Alone Paper

Engaging out-of-field teachers as learners: when is it too much?

David Perl-Nussbaum*, Weizmann Institute of Science, Israel
Dana Vedder-Weiss, Ben-Gurion University of the Negev, Israel
Edit Yerushalmi, Weizmann Institute of Science, Israel

Stand-Alone Paper

Early Career STEM Teacher Burnout: Trends and Explanations

Shannon Navy*, Kent State University, USA
Ella Yonai*, University of Georgia, USA
Adepeju Prince, Kent State University, USA

Stand-Alone Paper
Does Remuneration and Recognition Matter in Attrition? Science Teachers' Experiences in the Teacher Incentive Allotment
Rebecca Hite*, Texas Tech University, USA
Gina Childers*, Texas Tech University, USA
Jessica Gottlieb, Texas Tech University, USA
Alexander Wiseman, Texas Tech University, USA

Strengthening Science Teaching through Mentoring, Modeling, and Professional Development

Strand 8: In-service Science Teacher Education
25-Mar-25, 10:00 AM-11:30 AM
Location: Annapolis 3

Stand-Alone Paper
Science Teachers and District Science Leaders: A Complex Pragmatic Study of Support and Instruction
Julie Luft*, University of Georgia, USA
Joseph Deluca, University of Georgia, USA
Yuxi Huang, University of California, USA
Xinyu He, University of Georgia, USA
Elizabeth Ayano,University of Georgia, USA
Ella Yonai, University of Georgia, USA
Brooke Whitworth, Clemson University, USA

Stand-Alone Paper
Teachers'Professional Development Based on Learning Progression for Metamodelling and Modeling Practice
Yi-Xuan Liu*, Beijing Normal University, China
Xin-Hao Song, Beijing Normal University, China
Jian-Xin Yao, Beijing Normal University, China

Stand-Alone Paper
Putting it to Practice: Exploring the Practical Implementation of Educative Mentoring Concepts
Amanda Hall*, North Carolina State University, USA
Soonhye Park, North Carolina State University, USA

Stand-Alone Paper
Investigating Cross-Grade Discussions around Science Teaching Practice in Vertical Professional Learning Communities
Jose Felipe Martinez, UCLA, USA
Matthew Kloser*, University of Notre Dame, USA
Michael Szopiak, University of Notre Dame, USA
Marlene Saint Martin Guerra, UCLA, USA
Justin Betzelberger,UCLA, USA
Richard Huyn, UCLA, USA

Interdisciplinary and STEM learning Pathways

Strand 10: Curriculum and Assessment
25-Mar-25, 10:00 AM-11:30 AM
Location: Magnolia 1

Stand-Alone Paper
Developing and Validating the Interdisciplinary Science Assessment of Carbon Cycling II
Hyesun You*, The University of Iowa, USA

Sunyoung Park,
sunyoungpark@callutheran.edu, USA
Soo Hyun Yang*, The University of Texas at Austin, USA

Stand-Alone Paper

Advancing Ultra-Orthodox and Religious Male Students through Interdisciplinary Practical Engineering Program

Ruth Edri*, Technion - Israel institute of technology, Israel
Shahaf Rocher-Yoel, Technion - Israel institute of technology, Israel
Yehudit Dori, Technion - Israel institute of technology, Israel

Stand-Alone Paper

Developing and Evaluating an Online Biomedical Curriculum on Blood Disorders for High School Students

Tingting Yang*, St. Jude Children's Research Hospital, USA
Amanda Etherington*, St. Jude Children's Research Hospital, USA
Torrean Johnson, St. Jude Children's Research Hospital, USA
Kyle Bichsel, St. Jude Children's Research Hospital, USA
Robyn Pennella,St. Jude Children's Research Hospital, USA
Eric Rivera-Peraza, St. Jude Children's Research Hospital, USA
Katherine Ayers, St. Jude Children's Research Hospital, USA

Misinformation in Science Media - Enhancing the Evaluation of Credibility in Digital Contexts

Strand 12: Technology for Teaching, Learning, and Research
25-Mar-25, 10:00 AM-11:30 AM
Location: Baltimore 5

Symposium

'Misinformation in Science Media'' - Enhancing the Evaluation of Credibility in Digital Contexts

Kerstin Kremer*, Justus Liebig University, Germany
Alexander Büssing*, Technische Universität Braunschweig, Germany
Andreas Nehring*, Leibniz University Hanover, Germany
Soraya Kresin*, Technische Universität Braunschweig, Germany
Margot Bakker,Technische Universität Braunschweig, Germany
Daniel Pimentel*, The University of Alabama, USA
Ayelet Baram-Tsabari, Technion – Israel Institute of Technology, Israel
Shakked Dabran-Zivan*, Technion – Israel Institute of Technology, Israel
Lisa Selent, Leibniz University Hanover, Germany
Catharina Pfeiffer, Leibniz University, Germany
Stefanie Lenzer, IPN - Leibniz Institute for Science and Mathematics Education, Germany
Jonathan Osborne, Stanford University, USA
Douglas Allchin, University of Minnesota, USA

Affordances, Imagination, and Learner Agency

Strand 13: History, Philosophy, Sociology, and Nature of Science
25-Mar-25, 10:00 AM-11:30 AM
Location: Camellia 1

Stand-Alone Paper
Affordances of citizen science for developing student understanding of the nature of science
Zoubeida Dagher*, University of Delaware, USA

Stand-Alone Paper
Scientific Imagination and Scientific Modeling
Amy Farris*, Penn State University, USA

Stand-Alone Paper
Agential Variation Theory: Towards a Post-humanist Performative Framework for Research onStudents Learning with Representations
Song Wang*, California State University - Dominguez Hills, USA
Stanley Lo, University of California, San Diego, USA
Thomas Bussey, University of California, San Diego, USA

Environment and Citizenship

Strand 14: Environmental Education and Sustainability
25-Mar-25, 10:00 AM-11:30 AM
Location: Baltimore 3

Stand-Alone Paper
Sustainability Citizenship: A European-wide Professional Development vision
Franz Bogner*, University of Bayreuth, Germany
Sofoklis Sotiriou, Ellinogermaniki Agogi, Greece

Stand-Alone Paper
Which factors affect the implementation of Citizen Science in school science classrooms?
Michelle Müller*, Leibniz University Hannover, Germany
Vanessa van den Bogaert, Leibniz University Hannover, Germany
Malte Foss-Jähn, Leibniz University Hannover, Germany
Pauline Klein, RWTH Aachen University, Germany
Julia Lorke,RWTH Aachen University, Germany
Till Bruckermann, Leibniz University Hannover, Germany

Stand-Alone Paper
Fostering Socioscientific Reasoning, Global Citizenship, and Cooperation in Teacher Candidates through Inter-University and Place-Based Collaboration
Banu Avsar Erumit, Recep Tayyip Erdogan University, Turkey
Arzu Tanis Ozcelik*, Aydin Adnan Menderes University, Turkey

Sustainability education with teachers: Collaborating to support teachers, communities, and children, towards critical, visionary future-making

Strand 14: Environmental Education and Sustainability
25-Mar-25, 10:00 AM-11:30 AM
Location: Annapolis 4

Symposium

Sustainability education with teachers: Collaborating to support teachers, communities, and children, towards critical, visionary future-making

Heather Schurman, Université de Montréal, Canada
Jrène Rahm, Université de Montréal, Canada
Ayça Fackler, University of Missouri, USA
Cecilia Poon, Brooklyn College, CUNY, USA
Pieranna Pieroni,Brooklyn College, CUNY, USA
Theila Smith, Brooklyn College, USA
Christina Siry, University of Luxembourg, Luxembourg
Doriana Sportelli, University of Luxembourg, Luxembourg
Patricia Muller, École fondamentale de Beaufort, Luxembourg
Sara Wilmes, University of Luxembourg, Luxembourg

Exploring the Interplay between Educational Data and Current or Future Science Educational Policy

Strand 15: Policy, Reform, and Program Evaluation
25-Mar-25, 10:00 AM-11:30 AM
Location: Azalea 3

Stand-Alone Paper

Public Opinion About Teacher Salaries: Does it Pay to be a Male Science Teacher?

Eugene Judson, Arizona State University, USA
Mohammed Ibrahim*, Arizona State University, USA

Stand-Alone Paper

Consistent and Comparable Educational Data: Returning to School During the COVID-19 Era

Molly Weinburgh*, Texas Christian University, USA
Melissa Demetrikopoulos, Institute of Biomedical Philosophy, USA
John Pecore, University of West Florida, USA
Zhan Shi, Texas Christian University, USA
Daniella Biffi,Texas Christian University, USA
Dean Williams, Texas Christian University, USA

Stand-Alone Paper

Policy Analysis of Middle School Science Acceleration and High School Science Outcomes

Jon Steigerwald, Stony Brook University, USA
Angela Kelly, Stony Brook University, USA

Stand-Alone Paper

The million learning minutes yardstick: comparing educational modalities using a time metric

Yuval Rosenberg*, Weizmann Institute of Science, Israel
Asaf Salman, Weizmann Institute of Science, Israel
Yossi Elran, Weizmann Institute of Science, Israel
Giora Alexandron, Weizmann Institute of Science, Israel
Ron Milo,Weizmann Institute of Science, Israel

Strand Meetings

25-Mar-25, 11:30 AM-12:45 PM

Strand 1: Meet with Strand Coordinators
Location: Annapolis 2

Strand 2: Meet with Strand Coordinators
Location: Annapolis 1

Strand 3: Meet with Strand Coordinators
Location: Baltimore 2

Strand 4: Meet with Strand Coordinators
Location: Baltimore 4

Strand 5: Meet with Strand Coordinators
Location: Magnolia 3

Strand 6: Meet with Strand Coordinators
Location: Magnolia 2

Strand 7: Meet with Strand Coordinators
Location: Cherry Blossom Terrace

Strand 8: Meet with Strand Coordinators
Location: Annapolis 3

Strand 10: Meet with Strand Coordinators
Location: Magnolia 1

Strand 11: Meet with Strand Coordinators
Location: Azalea 1

Strand 12: Meet with Strand Coordinators
Location: Baltimore 5

Strand 13: Meet with Strand Coordinators
Location: Camellia 1

Strand 14: Meet with Strand Coordinators
Location: Baltimore 3

Strand 15: Meet with Strand Coordinators
Location: Azalea 3

A Celebration of Outstanding Doctoral Research Award Recipients, Early Career Award Recipients and new NARST Fellows: A Discussion of the Future of Science Education

25-Mar-25, 12:45 PM-2:15 PM
Location: Azalea 2

Administrative Session
Organizer
Amelia Gotwals, Michigan State University, USA
Panelists
Bridget Miller, University of South Carolina, USA
Daivid Owens, University of Montana, USA
Enrique Suárez, University of Massachusetts, Amherst, USA

Designing for Equitable Futures: Perspectives on Rebuilding and Healing in the Next Century of Teaching and Learning

25-Mar-25, 12:45 PM-2:15 PM
Location: Annapolis 4

Administrative Session
Organizers
Khanh Tran, Purdue University, West Lafayette, USA
Maria Maulucci, Barnard College, USA
Justice Walker, The University of Texas at El Paso, USA
Presenter
Tia Madkins, The University of Texas at Austin, USA

Empowering Asian and Pacific Islanders through Science Teaching and Learning for Public Good

25-Mar-25, 12:45 PM-2:15 PM
Location: Annapolis 2

Administrative Session
Organizers
Hosun Kang, University of Irvine California, Irvine, USA
Edna Tan, University of North Carolina at Greensboro, USA
Panelists
Johan Tabora, University of Illinois at Chicago, USA
Maria Varelas, University of Illinois at Chicago, USA
Anil Challa,University of Alabama, Tuscaloosa, USA
Meena Balgopal, Colorado State University, Fort Collins, USA
Bevo Wahono, University of Jember, Indonesia
Erlia Narulita, University of Jember, Indonesia
Anjar Utomo, University of Jember, Indonesia
Troy Sadler, University of North Caroline at Chapel Hill, USA

Contextualizing Science Education: Cognitive, Affective, and Personal Dimensions in Learning Science

Strand 1: Science Learning: Development of student understanding
25-Mar-25, 12:45 PM-2:15 PM
Location: Camellia 2

Stand-Alone Paper
The progressive construction of personally-inflected sense-making
Sara Satanassi*, Department of Physics and Astronomy, University of Bologna, Italy

Olivia Levrini, Department of Physics and Astronomy, University of Bologna, Italy

Stand-Alone Paper

Taking a Socio-Political Turn in Genetics Education

Ravit Duncan, Rutgers University, USA
Dalia Hassan*, Rutgers University, USA
Rishi Krishnamoorthy, University of Toronto, Canada
Na'ama Av-Shalom, Rutgers University, USA

Stand-Alone Paper

Mental Models of the Earth's Internal Structure in Primary and Middle School Students in Chile

Claudia Vergara*, Alberto Hurtado University, Chile
Kasandra Navarrete*, Alberto Hurtado University, Chile
Carolina Parraguez*, Pontificia Universidad Catolica de Valparaiso, Chile
Hernan Cofre, Pontificia Universidad Catolica de Valparaiso, Chile
Paola Nuñez,Pontificia Universidad Catolica de Valparaiso, Chile

Stand-Alone Paper

Does Context Matter? A Meta-Analysis of Contextualized Science Learning Research

Michael Giamellaro*, Oregon State University, USA
Joseph Taylor, University of Colorado, USA
Kathryn Watson, University of Iowa, USA
Amanda Morrison, Oregon State University, USA

Stand-Alone Paper

An Emerging Theory of School-Based Citizen Science

Patrick Smith*, Horizon Research, Inc., USA
Christine Goforth*, North Carolina Museum of Natural Sciences, USA
Sarah Carrier*, NC State University, USA
Meredith Hayes, Independent Researcher, USA
Sarah Safley,Horizon Research, Inc., USA
Danielle Scharen*, Horizon Research, Inc., USA

Stand-Alone Paper

Empowering Students through Open Schooling: Educational Seismology's Impact on Civic Responsibility and Science Learning Views

Yvoni Pavlou*, University of Cyprus, Cyprus
Marios Papaevripidou, University of Cyprus, Cyprus
Zacharias Zacharia, University of Cyprus, Cyprus
Gregory Milopoulos, Research and Development Department, Ellinogermaniki Agogi, Greece
Sofoklis Sotiriou,Research and Development Department, Ellinogermaniki Agogi, Greece
Gerasimos Chouliaras, Institute of Geodynamics, National Observatory of Athens, Greece

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Using inclusive, responsive teaching practices in diverse science classroom settings

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
25-Mar-25, 12:45 PM-2:15 PM
Location: Baltimore 4

Stand-Alone Paper

English Learners' Use of Home Language in a Science Classroom

Rebecca Robertson, University of Minnesota, USA

Preethi Titu*, Kennesaw State University, USA
Felicia Dawn Tibayan Leammukda*, St. Cloud State University, USA

Stand-Alone Paper
Refined Consensus Model for the teaching population who works with deaf students
Scott Cohen*, Georgia State University, USA
Patrick Enderle, Georgia State University, USA
Jessica Scott, Georgia State University, USA

Stand-Alone Paper
Moving away from "very cold and detached" teaching: In-Service Secondary Science Teachers of Emergent Bilinguals
Jorge Solis*, UT San Antonio, USA
Kristen Lindahl, UT San Antonio, USA
Bedrettin Yazan, UT San Antonio, USA
Michael Mauricio*, UT San Antonio, USA
Caryn Calisi,UT San Antonio, USA

Exploring Cognitive and Interpretive Processes in Undergraduate STEM Education

Strand 5: College Science Teaching and Learning (Grades 13-20)
25-Mar-25, 12:45 PM-2:15 PM
Location: Magnolia 3

Stand-Alone Paper
A Study Of Undergraduate Students Interpretations Of Tree-Thinking Using Eye Movements
Mallika Saha*, Texas State Universuty, USA
Daniel Ferguson, Texas State Universuty, USA
Kristy Daniel, Texas State Universuty, USA

Stand-Alone Paper
Exploring Meaning-Making in Undergraduate Human Anatomy and Physiology: Role of Drawing and Representation Construction
Sarah Hajama, Macquarie University, Australia
Hye-Eun Chu*, Macquarie University, Australia

Stand-Alone Paper
Student Learning, Perceptions of Learning, and Perceptions of a Flipped College Physiology Classroom
Elizabeth Stansberry*, Pepperdine University, USA
Krista Lucas*, Pepperdine University, USA
Rachel Tan, Pepperdine University, USA

Stand-Alone Paper
Individual differences in dispositions toward scientific uncertainty navigation during problem-based learning in cybersecurity education
Jongchan Park*, Arizona State university, USA
Ying-Chih Chen, Arizona State university, USA
Garima Agrawal, Arizona State university, USA
Yuli Deng, Arizona State university, USA
Huan Liu,Arizona State university, USA

STEM Partnerships, Interactions, and Learning in Museum Spaces

Strand 6: Science Learning in Informal Contexts
25-Mar-25, 12:45 PM-2:15 PM
Location: Magnolia 2

Stand-Alone Paper
The importance of knotworking in forming successful STEM partnerships
Eleanor Kenimer*, Michigan State University, USA
Roberta Hunter, New Jersey Audobon, USA
Gail Richmond*, Michigan State University, USA

Stand-Alone Paper
Using Natural History Museums as Professional Development for Elementary Teachers
Megan Ennes*, University of Florida, USA
Brian Abramowitz, University of Florida, USA
Melanie Giangreco, University of Florida, USA
Sadie Mills, University of Florida, USA

Stand-Alone Paper
Towards mindfulness: A Brazilian case study of a science museums response to the COVID-19 pandemic
Ana Maria Navas Iannini, Simon Fraser University, Canada
Karine Fernandes*, Simon Fraser University, Canada
Erminia Pedretti, University of Toronto, Canada

Exploring equity and Reflective practice to support teaching and learning

Strand 7: Pre-service Science Teacher Education
25-Mar-25, 12:45 PM-2:15 PM
Location: Baltimore 1

Stand-Alone Paper
Pre-Service Teachers' Views on Oral Presentations Assessments: The Influence of Social and Emotional Experiences.
Neha Anand*, Midway University, USA
Ella Yonai, University of Georgia, USA

Stand-Alone Paper
Supporting early career science teachers: Reflections from a mentoring initiative
Robbie Higdon*, James Madison University, USA

Stand-Alone Paper
Bridging Perspectives in Preservice Teacher Education: Exploring Ontological Pluralism for Critical Engagement, Inclusively, and Sustainability
Amy Green*, University of Maryland, USA
Angela Stoltz, University of Maryland, USA

Stand-Alone Paper
Exploring How Equity Perceptions Are Manifested in Preservice Teachers' Practices in Elementary Science Methods Course
Wanjoo Ahn*, Michigan State University, USA
Christina Schwarz, Michigan State University, USA

Evolving Pedagogical Content Knowledge in Science Teaching

Strand 8: In-service Science Teacher Education
25-Mar-25, 12:45 PM-2:15 PM
Location: Annapolis 3

Stand-Alone Paper
Pedagogical Content Knowledge of Climate Change in a biology teacher: A longitudinal case study
Catalina Cañete*, Pontificia Universidad Católica de Valparaíso, Chile
Hernan Cofré*, Pontificia Universidad Católica de Valparaíso, Chile

Stand-Alone Paper
Comparing science teacher sensemaking of complex genetics using different phenomena.
Sara Porter*, University of North Carolina at Greensboro, USA
Hilleary Osheroff, Exploratorium, USA

Stand-Alone Paper
Unpacking Teacher Content Knowledge Development: The Impact of Teaching Experience and Influential Factors
Ryan Nixon*, Brigham Young University, USA
Stefan Sorge*, Leibniz Institute for Science and Mathematics Education, Germany
Hannah Dudley, Brigham Young University, USA
Alexys Skidmore, Brigham Young University, USA

Stand-Alone Paper
Understanding the Complexity of Adaptive Teaching Expertise in Advancing Knowledge Generation in Elementary Science
Jale Ercan Dursun*, The University of Alabama, USA
Jee Kyung Suh, The University of Alabama, USA
Brian Hand, The University of Iowa, USA

Understanding and Appreciating How Science Teachers Reflect Student and Community Voices through Thematic Curricula

Strand 10: Curriculum and Assessment
25-Mar-25, 12:45 PM-2:15 PM
Location: Magnolia 1

Related Paper Set
Reclaiming the "Community" in Community Colleges: A Social Justice Approach to the Biology Curriculum
Marcela Bernal-Munera*, Malcolm X College, USA

Related Paper Set
We Don't Have to Reinvent the Wheel: Repurposing Learning for Ruptures in Restrictive Science Spaces
Diana Bonilla*, Northern Illinois University, USA

Related Paper Set
Negotiating Contesting Notions of Equity in Educational Policy to Co-Design Transdisciplinary Science Curriculum
Daniel Morales-Doyle*, University of Illinois, USA
Tomasz Rajski, Chicago Public Schools, USA

Related Paper Set
The Woven Copresence of Students in Transformative Science Teachers' Reflections and Stories

Alejandra Frausto Aceves*, Northwestern University, USA

Investigating Culturo-Techno-Contextual Approaches in Chemistry Education

Strand 11: Cultural, Social, and Gender Issues
25-Mar-25, 12:45 PM-2:15 PM
Location: Azalea 1

Stand-Alone Paper

Breaking the Barriers to Meaningful Learning of STEM in Africa: A Systematic Review of Culturo-Techno-Contextual-Approach

Taibat Olateju, Obafemi Awolowo University, (OAU), Nigeria
Adekunle Oladejo, Africa Centre of Excellence for Innovative and Transformative STEM Education, Lagos State University (LASU-ACEITSE), Nigeria
Peter Okebukola, Africa Centre of Excellence for Innovative and Transformative STEM Education, Lagos State University (LASU-ACEITSE), Nigeria
Rasheed Sanni, Africa Centre of Excellence for Innovative and Transformative STEM Education, Lagos State University (LASU-ACEITSE), Nigeria
Juma Shabani,Burundi Doctoral School, University of Burundi, Burundi
Angela Irene, National Universities Commission (NUC), Nigeria

Stand-Alone Paper

Enhancing Students' Attitude towards Chemistry using Culturo- Techno-Contextual Approach

Joy Olayemi, Lagos State University, Nigeria
Michael Ahove, Lagos State University, Nigeria
Hakeem Akintoye, Lagos State University, Nigeria
Peter Okebukola*, Lagos State University, Nigeria
Rasheed Sanni,Lagos State University, Nigeria
Adekunle Oladejo, Lagos State University, Nigeria

Stand-Alone Paper

Exploring the Effectiveness of Culturo-Techno-Contextual Approach on Students' Achievement in Chemistry

Nwanneka Nwani, Lagos State University, Nigeria
Joy Olayemi, Lagos State University, Nigeria
Michael Ahove, Lagos State University, Nigeria
Hakeem Akintoye, Lagos State University, Nigeria
Peter Okebukola*,Lagos State University, Nigeria
Adekunle Oladejo, Lagos State University, Nigeria

AR and VR in STEM Education

Strand 12: Technology for Teaching, Learning, and Research
25-Mar-25, 12:45 PM-2:15 PM
Location: Baltimore 5

Stand-Alone Paper

Preliminary investigation of Taiwanese undergraduates' approaches to learning lunar phases by holographic projection

Yang-Hsin Fan, The University of Texas at Austin, USA
Tzung-Jin Lin*, National Taiwan Normal University, Taiwan

Stand-Alone Paper

Fostering conceptual understanding with real, virtual, combined real and virtual, or VR experiments

Salome Flegr*, TU Dresden, Germany
Jochen Kuhn, LMU Munich, Germany

Stand-Alone Paper

Teaching Elementary Science Content to Future Teachers Using VR and CS Tools

Richard Bex*, Illinois State University, USA
Kent Crippen, University of Florida, USA
Minji Yun, University of Florida, USA
Darby Drageset, University of Florida, USA
Joanne Barrett,University of Florida, USA
Maya Israel, University of Florida, USA

Stand-Alone Paper

Unveiling the Causes of Awe in VR Among College Students

Tyler Harper-Gampp*, North Carolina State University, USA
Cesar Delgado*, North Carolina State University, USA
Khalid Alharbi, North Carolina State University, USA
Matthew Peterson, North Carolina State University, USA
Karen Chen,North Carolina State University, USA

Equity and Indentity in Science Learning

Strand 13: History, Philosophy, Sociology, and Nature of Science
25-Mar-25, 12:45 PM-2:15 PM
Location: Camellia 1

Stand-Alone Paper

'Who Do You Imagine as Scientists?": Intersecting NOS and Social Justice in Natural History Museums

Anna Pshenichny-Mamo*, Technion – Israel Institute of Technology, Israel
Wilton Lodge, University College London, United Kingdom
Dina Tsybulsky, Technion – Israel Institute of Technology, Israel

Stand-Alone Paper

Facing Time Alienation through the Learning of Science

Veronica Ilari, University of Bologna, Italy
Francesco De Zuani Cassina, University of Bologna, Italy
Olivia Levrini*, University of Bologna, Italy

Stand-Alone Paper

'I believe they consider me a scientist": Exploring connections between NOS understandings and science identities

Renee Schwartz*, Georgia State University, USA
Heidi Turcotte*, Georgia State University, USA
Julia Grimes*, Georgia State University, USA
Robert Bennett*, Georgia State University, USA
Aihanh Maasen*,Georgia State University, USA
Sureka Taylor*, Georgia State University, USA

Stand-Alone Paper
Ensuring Equitable Opportunities to Improve How Blind Students Conceptualize the Nature of Science
Tina Stamper*, Indiana University, USA

Environmental Education

Strand 14: Environmental Education and Sustainability
25-Mar-25, 12:45 PM-2:15 PM
Location: Baltimore 3

Stand-Alone Paper
Environmental Health Education: A Way to Address Potential Health Risk from Pesticides in Kindergarten Students
Silvia Ramos De Robles*, University of Guadalajara, Mexico
Verónica Pérez Serrano Flores, Universidad Panamericana, Mexico
Irma García Villegas, University of Guadalajara, Mexico
Ana Alatorre Rodríguez, University of Guadalajara, Mexico
Claudia Huerta Rodea,Instituto Superior de Investigación y Docencia para el Magisterio, Mexico

Stand-Alone Paper
Enhancing learners' awareness about Indigenous Knowledge Systems benefits in environmental science classroom
Alvin Riffel, University of the Western Cape, South Africa
Frikkie George, Cape Peninsula University of Technology, South Africa
Keith Langenhoeven, University of the Western Cape, South Africa
Noluthando Hlazo, Cape Peninsula University of Technology, South Africa

Stand-Alone Paper
From Research to Classroom: Using Scholarly Expertise to Address the Phosphorus Challenge
Julianna Nieuwsma*, North Carolina State University, USA
M. Gail Jones*, North Carolina State University, USA
Madeline Stallard, North Carolina State University, USA

Stand-Alone Paper
Understanding interdisciplinary teaching and learning: Middle school case study of environmental sustainability education
Xavier Fazio*, Brock University, Canada

Limitations and constraints

Strand 14: Environmental Education and Sustainability
25-Mar-25, 12:45 PM-2:15 PM
Location: Baltimore 2

Stand-Alone Paper
Rural Families Learning Geosciences Concepts in an Outdoor Children's Garden
Heather Zimmerman*, Penn State University, USA
Susan Land, Penn State University, USA
Bryan Brightbill, Penn State University, USA

Stand-Alone Paper
Constraints when Engaging with Locally Held, Landscape-Based Climate Knowledge in Map-based,

Adult Peer-to-Peer Community Learning
Heather Killen*, University at Buffalo, USA

Stand-Alone Paper
A taxonomy of encounters and experiences to assist educators who leverage wildlife to engage learners
Bryan Nichols*, Florida Atlantic University, USA

Towards a More Robust and Justice-Oriented Genetics Education

Strand 1: Science Learning: Development of student understanding
25-Mar-25, 2:30 PM-4:00 PM
Location: Annapolis 2

Symposium
Towards a More Robust and Justice-Oriented Genetics Education
Ravit Duncan*, Rutgers University, USA
Deb Kelemen, Boston University, USA
Léa Tân Combette, Boston University, USA
Kostas Kampourakis, University of Geneva, Switzerland
Dalia Hassan,Rutgers University, USA
Michal Haskel-Ittah, Weizmann Institute of Science, Israel
Niklas Gericke, Karlstad University, Sweden
Malka van Dijk, Weizmann Institute of Science, Israel
Anat Yarden, Weizmann Institute of Science, Israel
Gregory Radick, University of Leeds, United Kingdom
Rishi Krishnamoorthy, University of Toronto, Canada
Dalia Hassan, Rutgers University, USA
Na'ama Av-Shalom, Rutgers University, USA
Phyllis Illari, University College London, United Kingdom
Federica Russo, Utrecht University,
Giora Alexandron, Weizmann Institute of Science, Israel
Asaf Salman, Weizmann Institute of Science,
Moriah Ariely, Weizmann Institute of Science,

Partners in Project and Place-Based K-12 STEM Learning: A Model for Ambitious Teaching and Learning

Strand 2: Science Learning: Contexts, Characteristics and Interactions
25-Mar-25, 2:30 PM-4:00 PM
Location: Annapolis 1

Related Paper Set
The Teaching School: Examining STEM Teacher Learning in Embedded, Extended, and Place-Based Teacher Education
Rachael Gordon, University of Michigan, USA
Elizabeth Moje, University of Michigan, USA
Bridget Maher*, University of Michigan, USA
Alistair Bomphray, University of Michigan, USA
Michaela O'Neill,University of Michigan, USA

Related Paper Set
Tracing elementary student learning and literacies in residents' classrooms in science PPBL
Bridget Maher*, University of Michigan, USA

Related Paper Set
Tracing high school students' engineering learning and literacies in residents' classrooms over time
Emily Rainey*, University of Pittsburgh, USA
Bridget Maher*, University of Michigan, USA
Elizabeth Moje, University of Michigan, USA

Related Paper Set
Centering Students and Community: Designing and Engaging in Human-Centered Engineering and Design
Sneha Rathi*, Detroit Public Schools Community District, USA
Hunter Janness*, Detroit Public Schools Community District, USA
Rachael Gordon, University of Michigan, USA
Elizabeth Moje, University of Michigan, USA

Transforming STEM Learning Through Socioscientific Engagement

Strand 5: College Science Teaching and Learning (Grades 13-20)
25-Mar-25, 2:30 PM-4:00 PM
Location: Magnolia 3

Stand-Alone Paper
Collaborative Causal-Loop Modeling as a Support Socioscientific Decision-Making
Eric Kirk*, University of North Carolina at Chapel Hill, USA
Heewoo Lee, University of North Carolina at Chapel Hill, USA
Troy Sadler, University of North Carolina at Chapel Hill, USA

Stand-Alone Paper
Using A Socio-scientific Issues Framework for Implementing Citizen Science Projects in an Undergraduate Biology Class.
Muhammad Ijaz*, University of Massachusetts-Dartmouth, USA
Hamza Malik, Lloyd Center for the Environment, USA
Stephen Witzig, University of Massachusetts-Dartmouth, USA

Stand-Alone Paper
Professional development for faculty to engage students as scientists using a socioscientific issues-based approach
Stephen Witzig*, University of Massachusetts - Dartmouth, USA
Muhammad Ijaz, University of Massachusetts - Dartmouth, USA
S.M. Mushfiquer Rahman Ashique, University of Massachusetts - Dartmouth, USA
Hamza Malik, The Lloyd Center for the Environment, USA
Rachel Stronach,University of Massachusetts - Dartmouth, USA
Kathryn Kavanagh, University of Massachusetts - Dartmouth, USA
Robert Gegear, University of Massachusetts - Dartmouth, USA

Stand-Alone Paper
Towards a Transformational STEM Consciousness: A Mixed Methods Study on a Liberatory STEM Outcome
Juan Garibay, University of Virginia, USA
Lindsay Wheeler, University of Virginia, USA

Exploring Science Learning Through Outdoor and Real-World Experiences

Strand 6: Science Learning in Informal Contexts
25-Mar-25, 2:30 PM-4:00 PM
Location: Magnolia 2

Stand-Alone Paper
Nature-Based Learning as a Context for Science Inquiry: Benefits and Challenges from Students Perspective
Yetunde Mabadeje*, University of Iowa, USA
Kay Ramey, University of Iowa, USA
Mandy Dunphy, Baylor University, USA

Stand-Alone Paper
Encountering Freedom: A Comparative Case Study of a Formal Classroom and Nature-based Informal Learning Environment
Mandy Dunphy*, Baylor University, USA
Kay Ramey, University of Iowa, USA
Brian Hand, University of Iowa, USA
Ted Neal, University of Iowa, USA

Stand-Alone Paper
Students as Researchers Scientists: Connecting Real-world Experiences Scientific Concepts through a Coastal Ecology Summer Program
S.M. Mushfiquer Rahman Ashique*, University of Massachusetts Dartmouth, USA
Hamza Malik*, Lloyd Center for the Environment, USA
Rachel Stronach, Lloyd Center for the Environment, USA
Stephen Witzig, University of Massachusetts Dartmouth, USA

Stand-Alone Paper
Gardening During a Global Pandemic: Time for Nesting, Neighbors, Nature and Knowledge
Elysa Corin*, Institute for Learning Innovation, USA
Eric Jones, UT Health Houston, USA

Research, Methods and Assessment in Preservice Teacher Education

Strand 7: Pre-service Science Teacher Education
25-Mar-25, 2:30 PM-4:00 PM
Location: Baltimore 1

Stand-Alone Paper
Humanized Science, Humanized Teaching: Examining How a Research Experience Supported one Pre-Service Teacher's Practice
Matthew Adams*, Michigan State University, USA
Lulu Bogun, Michigan State University, USA
David Stroupe, University of Utah, USA

Stand-Alone Paper
Fostering Productive scientific Discourse Through Talk Moves: Focus on undergraduate courses for pre-service science teachers
Hadeel Edrees Dabbah*, Ben-Gurion University of the Negev, Israel
Orit Ben-Zvi Assaraf, Ben-Gurion University of the Negev, Israel

Stand-Alone Paper
Assessment of pPCK Competency Profiles Using a Language Model and Machine Learning

Jannis Zeller*, Paderborn University, Germany
Josef Riese, Paderborn University, Germany

Stand-Alone Paper

A cluster analysis of pre-service physics teachers' attitudes towards digital media

David Weiler*, Eberhard Karls Universität Tübingen, Germany
Jan-Philipp Burde, Eberhard Karls Universität Tübingen, Germany
Rike Große-Heilmann, Universität Paderborn, Germany
Andreas Lachner, Eberhard Karls Universität Tübingen, Germany
Josef Riese,Universität Paderborn, Germany
Thomas Schubatzky, Universität Innsbruck, Austria

Empowering Teachers: Computational Thinking and Quantum Education

Strand 8: In-service Science Teacher Education
25-Mar-25, 2:30 PM-4:00 PM
Location: Annapolis 3

Stand-Alone Paper

Empowering Teacher-Driven Computational Thinking Integration through Collaborative Partnerships

Andrew Elby*, University of Maryland, USA
Amy Green*, University of Maryland, USA
Jennifer Radoff, University of Maryland, USA
Khusbu Dalal, University of Maryland, USA

Stand-Alone Paper

Exploring Factors Influencing Elementary Teachers Future Implementation of Computer Science Curricula Integrated with Math/Science

Dilara Kara-Zorluoglu*, University of Nevada Las Vegas, USA
Hasan Deniz, University of Nevada Las Vegas, USA
Ezgi Yesilyurt, Weber State University, USA
Erdogan Kaya, George Mason University, USA
Refika Turgut,University of South Carolina-Upstate, USA
Elif Adibelli-Sahin, Development Workshop, Turkey

Stand-Alone Paper

Qualitative Analysis of Precollege Teachers' Attitudes Towards Teaching Quantum Information Science and Technology

Michele Darienzo, Stony Brook University, USA
Angela Kelly*, Stony Brook University, USA
Tzu-Chieh Wei, Stony Brook University, USA
Dominik Schneble, Stony Brook University, USA

Stand-Alone Paper

Teacher Knowledge of Quantum Information Science and Technology and Pedagogical Self-Efficacy

Andrea Zinn, Stony Brook University, USA
Angela Kelly, Stony Brook University, USA
Tzu-Chieh Wei, Stony Brook University, USA
Dominik Schneble, Stony Brook University, USA
Michele Darienzo,Stony Brook University, USA

Exploring the Systemic Nature of Curriculum Development and Implementation in Elementary Science

Strand 10: Curriculum and Assessment
25-Mar-25, 2:30 PM-4:00 PM
Location: Magnolia 1

Related Paper Set
Iterative Design of Wondering Elementary's Assessment System: Promises and Challenges
Amelia Gotwals*, Michigan State University, USA
Christie Morrison Thomas, Michigan State University, USA
Amanda Dahl, Michigan State University, USA

Related Paper Set
Design Considerations in Integrating Mathematics for Scientific Sensemaking in Elementary Science
Cathery Yeh*, The University of Texas at Austin, USA
Amy Johnson, The University of Texas at Austin, USA
Lauren Rigby, The University of Texas at Austin, USA

Related Paper Set
Designing Curriculum-Based Professional Learning for Elementary Science Teachers: Addressing Instructional Shifts and Supporting Sensemaking
Susan Gomez Zwiep*, BSCS Science Learning, USA
Janna Mahfoud, BSCS Science Learning, USA
Amy Belcastro, BSCS Science Learning, USA

Related Paper Set
Teachers' sensemaking of educative features in OpenSciEd Elementary Curriculum
Kennedy Hay*, Oakland University, USA
María González-Howard*, University of Texas - Austin, USA
Amber Bismack*, Oakland University, USA
Leticia Garza, University of Texas - Austin, USA
Carla Robinson,University of Texas - Austin, USA

Related Paper Set
Organizational Contexts of the Implementation of New OpenSciEd Elementary Science Instructional Materials
Christa Haverly*, Northwestern University, USA
Jason Buell*, Northwestern University, USA
Yang Zhang, Northwestern University, USA
Yaying Wu, Northwestern University, USA
Brian Reiser,Northwestern University, USA

Fostering Inclusive Praxis Within and Beyond the Science Classroom

Strand 11: Cultural, Social, and Gender Issues
25-Mar-25, 2:30 PM-4:00 PM
Location: Azalea 2

Stand-Alone Paper
Challenges in the study of inclusive science education – Results of a Delphy Study

Lisa Stinken-Rösner*, Bielefeld University, Germany
Jürgen Menthe, University of Hildesheim, Germany
Elizabeth Watts, Bauhaus-Universität Weimar, Germany
Felix Pawlak, Eberhard Karls University of Tübingen, Germany

Stand-Alone Paper
'Our ideas were reflected in the stage": Investigating Fictive Kinships in a Community-Based STEM Program
Ti'Era Worsley*, Northern Virginia Community College, USA
Rasheda Likely, Kennesaw State University, USA

Stand-Alone Paper
Seeking Gender Equity in an Out-of-School Computer Science Program
Lydia Burke*, University of Toronto, Canada

Stand-Alone Paper
Generating Third Spaces of Science Learning for Urban Middle School Children in Indias Public Schools
Nivedha Sundar*, Indiana University, USA
Gayle Buck, Indiana University, USA

Stand-Alone Paper
Empowering Science Praxis: Lessons from Socially Just Science Teacher of Color
KELLYANN RAMDATH*, University at Buffalo, USA

Venturing Beyond Boundaries to Explore Inclusive Practices in Science Education Across Contexts

Strand 11: Cultural, Social, and Gender Issues
25-Mar-25, 2:30 PM-4:00 PM
Location: Azalea 1

Related Paper Set
Connecting With Values in STEM Education: Integrating Indigenous and Western Learning in K-12 Classroom
Jennifer Jenkins*, Edith Bowen Laboratory School, USA
Breanne Litts*, Utah State University, USA
Melissa Tehee, Utah State University, USA
Darren Parry, University of Utah, USA
Stuart Baggaley,Edith Bowen Laboratory School, USA
Kenden Quayle, Utah State University, USA
James Cawley, Centerstar, USA

Related Paper Set
Community-led curriculum design: Community teacher perspectives on place-based education
Dayna DeFeo, University of Alaska Anchorage, USA
Trang Tran*, University of Alaska Anchorage, USA
Abby Rhinehart, University of Alaska Anchorage, USA

Related Paper Set
Fostering Familial Presence through an Identities-in-Practice Perspective
Wisam Sedawi*, University of Michigan, USA
Angela Calabrese Barton, University of Michigan, USA

Related Paper Set
Graduate Student Mentors' Navigation of Uncertainty in a Field Science Camp
Priyanka Parekh*, Northern Arizona University, USA
Ron Gray*, Northern Arizona University, USA

Future STEM Teachers Preparation in the AI Era

Strand 12: Technology for Teaching, Learning, and Research
25-Mar-25, 2:30 PM-4:00 PM
Location: Baltimore 4

Stand-Alone Paper
Preparing in-service science teachers for the AI era: insights from an "AI literacy" academic course
Ron Blonder*, Weizmann Institute of Science, Israel
Mutlu Cukurova, University College London, United Kingdom
Giora Alexandron, Weizmann Institute of Science, Israel

Stand-Alone Paper
Exploring Preservice Biology Teachers' Technology-Related Beliefs: A Network Analysis
Sarah Wilken*, University of Münster, Germany
Benedikt Heuckmann, University of Münster, Germany

Stand-Alone Paper
Exploring Challenges and Solutions in Implementing Computational Thinking in Elementary Science Education for Future Teachers
Yuanhua Wang*, West Virginia University, USA
Ugur Kale, Indiana University, USA

Stand-Alone Paper
A Longitudinal Investigation of Prompting Strategies among Pre-Service-Chemistry-Teachers in a Course on Generative Artificial Intelligence
Martin Sigot, University of Graz, Austria
Sebastian Tassoti*, University of Graz, Austria

Using Digital Tools in STEM Learning

Strand 12: Technology for Teaching, Learning, and Research
25-Mar-25, 2:30 PM-4:00 PM
Location: Baltimore 5

Stand-Alone Paper
Leftovers From COVID-19: Pre-Service Teachers Leveraging Digital Tools to Enhance Science Discourse
Bryan Brown*, Stanford University, USA
Lisa Archuleta*, Stanford University, USA
Polly Diffenbaugh, Stanford University, USA
Brandi Cannon-Force, Stanford University, USA

Stand-Alone Paper
Design Considerations of an AI-Powered Teacher Dashboard for Science Practical Work
Edwin Chng*, National Institute of Education, Singapore
Bertrand Schneider, Harvard Graduate School of Education, USA

Stand-Alone Paper
Enhancing Mathematical Modeling in Science Education through Simulation-Based Learning Environments.
Benjamin Stöger*, Technical University of Munich, Germany
Claudia Nerdel, Technical University of Munich, Germany

Stand-Alone Paper
Students' learning in a MOOC guided by in-field and out-of-field teachers
Guy Raviv*, Technion - Israel Institute of Technology, Israel
Asnat Zohar, Technion - Israel Institute of Technology, Israel
Shulamit Kapon*, Technion - Israel Institute of Technology, Israel

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Disciplinary Expertise and Perspectives

Strand 13: History, Philosophy, Sociology, and Nature of Science
25-Mar-25, 2:30 PM-4:00 PM
Location: Camellia 1

Stand-Alone Paper
Cascading Mentorship and Nature of Scientist for a High School STEMM Internship
Bridget Mulvey*, Kent State University, USA

Stand-Alone Paper
Nature of Science from the Perspectives of Science Practitioners across Different Disciplines
Ceren Soysal*, Middle East Technical University, Turkey
Ceyhan Cigdemoglu, Atılım University, Turkey
Ömer Geban, Middle East Technical University, Turkey

Stand-Alone Paper
The Nature of Engineering: Bridging Gaps in Understanding Between Engineering Experts and Pre-service Science Teachers
Tamar Ginzburg, Technion - Israel Institute of Technology, Israel
Miri Barak, Technion - Israel Institute of Technology, Israel
Sibel Erduran, University of Oxford, United Kingdom

Stand-Alone Paper
Epistemological Beliefs about the Nature of Science of University Professors in Physics Teacher Education
Gabriela Ferreira*, University of Santa Catarina, Brazil
Dana Zeidler, University of South Florida, USA

Exploring How Embedding Indigenous Knowledge and Practices into STEM Education Promotes Health and Well-Being

Strand 14: Environmental Education and Sustainability
25-Mar-25, 2:30 PM-4:00 PM
Location: Woodrow Wilson Ballroom

Symposium
Exploring How Embedding Indigenous Knowledge and Practices into STEM Education Promotes Health and Well-Being

Julie Robinson*, University of North Dakota, USA
David Owens*, Georgia Southern University, USA
Lama Jaber*, Florida State University, USA
Sarah Voss*, Western Washington University, USA
Pauline Chinn*,University of Hawaii at Manoa, USA
Nichole Chlebek*, Florida International University, USA
Jadda Miller, UC Davis, USA
Franklin Aucapina*, New York Hall of Science, USA
Rebekah Hammack, Purdue University, USA
Bhaskar Upadhyay, University of Minnesota, USA

Integrating Strategies

Strand 14: Environmental Education and Sustainability
25-Mar-25, 2:30 PM-4:00 PM
Location: Baltimore 2

Stand-Alone Paper
Integrating Ethics and Values into Middle School Science: Adaptation and Implementation in a Rural School
Zhen Xu, University of North Carolina at Chapel Hill, USA
Rebecca Lesnefsky*, University of North Carolina at Chapel Hill, USA
Troy Sadler, University of North Carolina at Chapel Hill, USA
David Fortus, The Weizmann Institute of Science, Israel
Heewoo Lee,University of North Carolina at Chapel Hill, USA
Nannan Fan, University of North Carolina at Chapel Hill, USA
Keren Dalyot, The Weizmann Institute of Science, Israel
Shira Passentin, The Weizmann Institute of Science, Israel
Natasha Segal, The Weizmann Institute of Science, Israel

Stand-Alone Paper
Garden-based STEAM Learning and Childrens Self-efficacy for Environmental Action and Attitudes and Knowledge About Pollinators
Kathy Trundle*, Utah State University, USA
Rita Hagevik, University of North Carolina Pembroke, USA
Katherine Vela, Utah State University, USA
Lawrence Krissek, The Ohio State University, USA
Kaitlin Campbell,University of North Carolina Pembroke, USA
William Boone, Miami University, USA
Aurora Villa, Utah State University, USA

Stand-Alone Paper
Usable STEM: Student Outcomes Associated with The Iterative Science and Engineering Instructional Model
Nancy Songer*, University of Utah, USA
Julia Calabrese, University of Utah, USA
Holly Cordner, University of Utah, USA

Stand-Alone Paper
Nature's Mirror: Exploring Youths' Sense of Belonging in Social-Ecological Systems
Elizabeth Diaz-Clark, Colorado State University, USA
Anna Lavoie, Colorado State University, USA
Sara Bombaci, Colorado State University, USA
Meena Balgopal*, Colorado State University, USA

A showcase of research In Praise of Science Teachers funded by the US National Science Foundation: Roundtable discussions

25-Mar-25, 4:15 PM-5:45 PM
Location: Woodrow Wilson Ballroom

Administrative Session
Organizers
Melissa Luna, National Science Foundation, USA
Ravit Duncan, The Rutgers University, USA

Education for Sustainable Development in the context of Indigenous Knowledge Systems and contextual environments: Cases across Southern Africa and the United States of America

25-Mar-25, 4:15 PM-5:45 PM
Location: Azalea 3

Administrative Session
Organizers
Million Chauraya, Midland State University, Zimbabwe
Angela James, University of KwaZulu-Natal, South Africa
Presenters
Frackson Mumba, University of Virginia, Charlottesville, USA
Leonard Molefe, University of KwaZulu-Natal, South Africa
Nobuhle Mbanjwa,University of KwaZulu-Natal, South Africa
Martha Bishai, Umkhumbane Schools Project, Durban, South Africa
Julie Luft, University of Georgia, Athens, USA

National Academies of Sciences, Engineering, and Medicine Report on K-12 STEM Education and Workforce Development in Rural Areas

25-Mar-25, 4:15 PM-5:45 PM
Location: Baltimore 4

Administrative Session
Organizers
Rebekah Hammack, Purdue University, USA
Beth Cady, National Academies of Science Engineering and Medicine, USA
Presenters
Rebekah Hammack, Purdue University, USA
Guan Saw, Claremont Graduate University, USA
John McNamara, Washington State University, USA

Uncertainty in Science Education: Shaping a Research Agenda for an Emerging Field

Strand 2: Science Learning: Contexts, Characteristics and Interactions
25-Mar-25, 4:15 PM-5:45 PM
Location: Annapolis 2

Symposium
Uncertainty in Science Education: Shaping a Research Agenda for an Emerging Field
Marcus Kubsch*, Freie Universität Berlin, Germany
Hannah Kolbe, Freie Universität Berlin, Germany
Simon Tautz, IPN, Germany
Eugene Cox, University of Illinois Urbana-Champaign, USA
Engin Kardas,Karlsruhe University of Education, Germany

Ying-Chih Chen, Arizona State University, USA
Eve Manz, Boston University, USA
Isa Korfmacher, University of Münster, Germany
Simon Blauza, University of Münster, Germany
Amanda Garner, University of Tennessee, USA

Collaborative and Interdisciplinary Approaches to Facilitating Elementary Science Teacher Professional Development

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies
25-Mar-25, 4:15 PM-5:45 PM
Location: Camellia 2

Stand-Alone Paper
Citizen Science supports for elementary school teachers: Connecting science across disciplines
Sarah Carrier*, North Carolina State University, USA
Danielle Scharen*, Horizon Research, Inc., USA
Patrick Smith*, Horizon Research, Inc., USA
Christine Goforth, North Carolina Museum of Natural Sciences, USA
Meredith Hayes,Horizon Research, Inc., USA

Stand-Alone Paper
The Influence of Place-Based Education on Elementary Teachers' Sense of Agency for Science Instruction
Alison Mercier, University of Wyoming, USA
Anica Miller-Rushing*, Associated Universities Inc., USA

Stand-Alone Paper
An Environmental Center and Elementary School Partnership: A Cross-Case Analysis of Two Fifth Grade Teachers
Rachel Stronach*, University of Massachusetts Dartmouth, USA
Hamza Malik, Lloyd Center for the Environment, USA
Stephen Witzig, University of Massachusetts Dartmouth, USA

Stand-Alone Paper
Making Space in Elementary Science Instruction: Fostering Math and Science Achievement Through Curriculum Professional Learning
Kristin Gagnier, AnLar, USA
Kelly Fisher, AnLar, USA
Steven Holochwost, CUNY, USA
Manda Harvey, Prince George's County Public Schools, USA

Articulating Different Conceptualizations and Methodological Approaches for Studying Justice-centered Science Teaching in Various Contexts

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
25-Mar-25, 4:15 PM-5:45 PM
Location: Magnolia 1

Symposium
Articulating Different Conceptualizations and Methodological Approaches for

Studying Justice-centered Science Teaching in Various Contexts
Natalie Davis, University of Michigan, USA
Maria Varelas, University of Ilinois Chicago, USA
Angela Calabrese Barton, University of Michigan, USA
Wisam Sedawi, University of Michigan, USA
Edna Tan*,University of North Carolina at Greensboro, USA
Christopher Wright, Drexel University, USA
Hosun Kang, University of California Irvine, USA
Daniel Morales Doyle, Univeristy of Ilinois Chicago, USA
Monet Harbison, Drexel University, USA

Fostering Equity and Engagement in Undergraduate STEM Education

Strand 5: College Science Teaching and Learning (Grades 13-20)
25-Mar-25, 4:15 PM-5:45 PM
Location: Magnolia 3

Stand-Alone Paper
STEM Engagement Program as Resource for First-Generation College Students Authoring Pathways and Practices in Science
Stacy Olitsky*, Saint Joseph's University, USA

Stand-Alone Paper
Examining undergraduate experiences with "servingness" in service-learning outreach to pre-college computer science and engineering classrooms
Azizi Penn, Purdue, USA
Tamara Moore*, Purdue, USA
Kerrie Douglas, Purdue, USA

Stand-Alone Paper
Finding Evolution in Our Everyday Lives: Impact of an Expectancy Value Theory Intervention
Lisa Borgerding*, Kent State University, USA
Hannah Petrosky, Kent State University, USA
Mark Kershner, Kent State University, USA

Stand-Alone Paper
Questing for Relevance: Exploring Student Outcomes from Creative Assessment "Quests" in General Education Biology
Emily Walter*, California State University, Fresno, USA
Neha Mann*, California State University, Fresno, USA
Berenice Mendoza-Alcaraz*, California State University, Fresno, USA

Supporting Informal Science Educators and Learners

Strand 6: Science Learning in Informal Contexts
25-Mar-25, 4:15 PM-5:45 PM
Location: Magnolia 2

Stand-Alone Paper
How Educators Foster Learners' Interests, Self-Efficacy, and Outcome Expectations in an AI and Paleontology Camp
Christine Wusylko*, University of Florida, USA
Tonika Jones, University of Florida, USA
Ray Opoku, University of Florida, USA
Gabriella Haire, University of Florida, USA
Chih Hsuan Lin,University of Florida, USA

Nazanin Adhami, University of Florida, USA
Bruce McFadden, University of Florida, USA
Victor Perez, St. Mary's College of Maryland, USA
Brian Abramowitz, University of Florida, USA
Pavlo Antonenko, University of Florida, USA

Stand-Alone Paper

Supporting STEM identity development in Hispanic community college students via an informal science education internship

James Kisiel*, California State University Long Beach, USA

Stand-Alone Paper

Motivation And Barriers of Pre-Service Science Teachers About Outdoor Education

Soykan Sandıkçıoğlu*, Middle East Technical University, Turkey
Özgül Yılmaz Tüzün, Middle East Technical University, Turkey

Stand-Alone Paper

Unseen/Unsupported: Investigating Work Experiences of Informal Science Educators in Part-Time, Seasonal, and Temporary Roles

K. "Ren" Mendoza*, University of Nebraska at Omaha, USA
Emma Refvem, Durham Public Schools, United Kingdom
Mahima Saxena, University of Nebraska at Omaha, USA
Thomas Beatman, Omaha's Henry Doorly Zoo and Aquarium, USA
Maddie Lichti,University of Nebraska at Omaha, USA

Advancing Competencies and Reasoning in Preservice Science Teachers

Strand 7: Pre-service Science Teacher Education
25-Mar-25, 4:15 PM-5:45 PM
Location: Baltimore 1

Stand-Alone Paper

Decision-making competence of pre-service teachers regarding health-related dilemmas: an interview study on a competence model

Helena Aptyka*, University of Cologne, Cologne, Germany, Germany
Marleen Proksch, University of Cologne, Cologne, Germany, Germany
Jörg Großschedl, University of Cologne, Cologne, Germany, Germany
Kirsten Schlüter, University of Cologne, Cologne, Germany, Germany

Stand-Alone Paper

How can students distribute epistemic agency? Looking at regulative agency to better understand students' positions.

Carolina Barros*, Interunit Graduate Program in Sciences Teaching – University of São Paulo, Brazil
Maíra Batistoni e Silva, Physiology Department, Bioscience Institute of University of São Paulo, Brazil

Stand-Alone Paper

Uncovering Aspects Helping Pre-service Science Teachers to Use Modeling Practices

Paul Engelschalt*, Humboldt-Universität zu Berlin, Germany

Erik Maslyak, Humboldt-Universität zu Berlin, Germany
David Fortus, Weizmann Institute of Science, Israel
Dirk Krüger, Freie Universtiät Berlin, Germany
Annette Upmeier zu Belzen,Humboldt-Universität zu Berlin, Germany

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Exploring STEM in Teacher Preparation programs

Strand 7: Pre-service Science Teacher Education
25-Mar-25, 4:15 PM-5:45 PM
Location: Baltimore 2

Stand-Alone Paper
Position: Revising STEM Teacher Preparation Courses to Ground in Pedagogies of Care and Reflection
Christina Baze*, Northern Arizona University, USA

Stand-Alone Paper
Exploring the Relationship Between Science Content Knowledge and Engineering Practices in Preservice Teacher Education
Stacey Sneed*, Texas Tech University, USA
Jianlan Wang, Texas Tech University, USA

Stand-Alone Paper
Science/mathematics teaching identity constructs as predictors of persistence in a teacher preparation program.
Ingelise Giles*, Florida International University, USA
Zahra Hazari*, Florida International University, USA

Stand-Alone Paper
Engineering Design and the Development of Teacher Efficacy
Laura Wheeler*, Brigham Young University, USA
Ryan Nixon, Brigham Young University, USA

Adapting to Empower: Examining Teachers' Practical Ideologies for Promoting Epistemic Agency and Critical Science Agency

Strand 8: In-service Science Teacher Education
25-Mar-25, 4:15 PM-5:45 PM
Location: Annapolis 3

Related Paper Set
Beyond the Right Answer: Teachers' Ideological Stances and Pedagogical Decision-Making in Supporting Students' Epistemic Agency
Kevin Hall*, University of Illinois at Urbana-Champaign, USA
Nicholas Leonardi*, University of Illinois at Urbana-Champaign, USA
Logan Lauren, University of Illinois at Urbana-Champaign, USA
Christina Krist, Stanford University, USA
Barbara Hug,University of Illinois at Urbana-Champaign, USA

Related Paper Set
Finding the 'Sweet Spot' for Adaptations Leading to Pedagogically Generative Learning
Barbara Hug*, University of Illinois Urbana-Champaign, USA
Christina Krist*, Stanford University, USA
Nicholas Leonardi, University of Illinois Urbana-Champaign, USA

Kevin Hall, University of Illinois Urbana-Champaign, USA
Logan Lauren,University of Illinois Urbana-Champaign, USA

Related Paper Set

Community Asset Mapping as an Inroad to Critically Conscious Adaptation

Nga Hoang*, University of Colorado Boulder, USA
Melissa Campanella*, University of Colorado Boulder, USA
Kerri Wingert, Good Questions Research, USA
Mon-Lin Monica Ko, University of Colorado Boulder, USA

Related Paper Set

Leveraging Composite Methodologies for Characterizing Science Teacher Educators' Critical Consciousness

Enrique Suárez*, University of Massachusetts Amherst, USA
Danielle Crabtree, University of Massachusetts Amherst, USA

Learning from Women and Girls of Color in STEM Education

Strand 11: Cultural, Social, and Gender Issues
25-Mar-25, 4:15 PM-5:45 PM
Location: Azalea 1

Stand-Alone Paper

"Goodbye to what has been..." A Re-evaluation of The Black Women Experience in STEM

Jasmyne Yeldell*, UNC Chapel Hill, USA
Simone Wilson*, UNC Chapel Hill, USA
Anina Mahmud, UNC Chapel Hill, USA
Dionne Cross Francis, UNC Chapel Hill, USA
Kerrie Wilkins-Yel,UMass Boston, USA

Stand-Alone Paper

'Through the fire...: Re-Examining mental health and persistence in STEM for Women of Color

Simone Wilson*, University of North Carolina at Chapel Hill, USA
Seonmi Jin, Indiana University, USA
Pavneet Kaur Bharaj, California State University, USA
Jasmyne Yeldell, University of North Carolina at Chapel Hill, USA
Anina Mahmud,University of North Carolina at Chapel Hill, USA
Kerrie Wilkins-Yel, University of Massachusetts, USA
Dionne Cross-Francis, University of North Carolina at Chapel Hill, USA

Stand-Alone Paper

What motivates career decisions of Women of Color in STEM? Exploration using Situated Expectancy-Value Theory

Anina Mahmud*, University of North Carolina at Chapel Hill, USA
Pavneet Bharaj, California State University, Long Beach, USA
Jasmyne Yeldell*, University of North Carolina at Chapel Hill, USA
Dionne Cross Francis, University of North Carolina at Chapel Hill, USA
Aishwarya Shridhar,University of Massachusetts Boston, USA
Kerrie Wilkins-Yel, University of Massachusetts Boston, USA

Stand-Alone Paper

Dear Science Teacher: A Message from Black and Latina Girls

Laura Peña-Telfer*, Georgia State University, USA

Natalie King, Georgia State University, USA

Reframing Science, Technology, and Society through Indigenous STEM Education

Strand 11: Cultural, Social, and Gender Issues
25-Mar-25, 4:15 PM-5:45 PM
Location: Annapolis 4

Symposium

Reframing Science, Technology, and Society through Indigenous STEM Education

Yu-Chieh Wu, University of Hawai'i at Mānoa, USA
Peresang Sukinarhimi, National Sun Yat-sen University, Taiwan
Paichi Pat Shein*, National Sun Yat-sen University, Taiwan
Keiphe Setlhatlhanyo, University of Botswana, Botswana
Richie Moalosi,University of Botswana, Botswana
Yaone Rapitsenyane, University of Botswana, Botswana
Ritesh Khunyakari, Tata Institute of Social Sciences, India
Sefiso Khumalo, Da Vinci Institute of Technology, South Africa
Indu Viswanathan, Hindu University of America, USA
Piata Allen, School of Māori and Indigenous Education, New Zealand

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STEM Education in Social-Cultural Context

Strand 12: Technology for Teaching, Learning, and Research
25-Mar-25, 4:15 PM-5:45 PM
Location: Baltimore 5

Stand-Alone Paper

Where Culture, Technology, and Context Meet: Enhancing Artificial Intelligence Education through CTCA

Sia Koroma, Lagos State University, Nigeria
Esther Peter, Lagos State University, Nigeria
David Peter, Lagos State University, Nigeria
Peter Okebukola, Lagos State University, Nigeria
Juma Shabani,University of Burundi, Burundi
Deborah Agbanimu, National Open University, Nigeria
Franklin Onowugbeda, Lagos State University, Nigeria
Adekunle Oladejo, Lagos State University, Nigeria
Olasunkanmi Gbeleyi, Lagos State University, Nigeria

Stand-Alone Paper

Black Middle Schoolers' Artificial Intelligence Self-Efficacy and Outcome Expectations in a Summer STEM Camp

Ray Opoku*, University of Florida, USA
Tonika Jones, University of Florida, USA
Gabriella Haire, University of Florida, USA
Christine Wusylko, University of Florida, USA
Chih Hsuan Lin,University of Florida, USA
Nazanin Adhami, University of Florida, USA
Natalie King, Georgia State University, USA

Pavlo Antonenko, University of Florida, USA

Stand-Alone Paper

Supporting Blended Math-Science Sensemaking Among College Students from Backgrounds Historically Marginalized in STEM Using Simulations

Leonora Kaldaras*, TexasTech University, USA
Carl Wieman, Stanford University, USA

Stand-Alone Paper

Adoption of Virtual Laboratories by Science Teachers in the Global South: Insights from South Africa

BRIAN SHAMBARE*, University of the Free State, South Africa
Thuthukile Jita, University of the Free State, South Africa

Scientific Literacy, Inquiry, and Representation

Strand 13: History, Philosophy, Sociology, and Nature of Science
25-Mar-25, 4:15 PM-5:45 PM
Location: Camellia 1

Stand-Alone Paper

What is Scientific Literacy: a 24 year meta-analysis

Judith Lederman*, Illinois Institute of Technology, USA
Renee Schwartz*, Georgia State University, USA
Selina Bartles, Valparaiso University, USA
Valarie Akerson, Indiana University, USA

Stand-Alone Paper

Scientific Literacy for Elementary Students- Kindergarten a Baseline Study

Selina Bartels*, Valparaiso University, USA
Judith Lederman*, Illinois Institute of Technology, USA

School Education Role

Strand 14: Environmental Education and Sustainability
25-Mar-25, 4:15 PM-5:45 PM
Location: Baltimore 3

Stand-Alone Paper

How Do High School Students See Climate Change? Examining Climate Change Visualizations in Lesson Plans

Kathleen Bordewieck*, North Carolina State University, USA
M. Gail Jones, North Carolina State University, USA
Rebecca Ward, North Carolina State University, USA
Sarah Carrier, North Carolina State University, USA
Meghan Manfra,North Carolina State University, USA
Madeline Stallard, North Carolina State University, USA
Tanzimul Ferdous, North Carolina State University, USA
Amber Meeks, North Carolina State University, USA
Stephanie Fiocca, North Carolina State University, USA
Beth Shaver, North Carolina State University, USA

Stand-Alone Paper
Latinx Students as Agents of Change in Community Environmental Issues: Teachers' Perspectives
Clare Baek*, University of California, Irvine, USA
Victoria Nguyen, University of California, Irvine, USA
Symone Gyles, University of California, Irvine, USA
Mark Warschauer, University of California, Irvine, USA

Stand-Alone Paper
Preschoolers' Experiential Learning in Educational Farm—Cognitive and Emotional Effects
Ornit Spektor-Levy*, Bar Ilan University, Israel
Moshe Castoriano, Bar Ilan University, Israel

Stand-Alone Paper
Island STYLE: Impacting Students Through Place-based Environmental Education Programs
Carol Waters*, University of Houston-Clear Lake, USA
Michelle Peters, University of Houston-Clear Lake, USA

Advancing AI in Science Education (AASE): Responsible and Ethical Uses of AI in Science Education

25-Mar-25, 6:00 PM-7:30 PM
Location: Azalea 3

Social Event
Organizers
Xiaoming Zhai, University of Georgia, Athens, USA
Kent Crippen, University of Florida, USA
Panelists
Kevin Haudek, Michigan State University, USA
Juan-Carlos Aguilar, Department of Education, Georgia, USA
Lei Liu,ETS, USA
Xiufeng Liu, University of Macau, China
Kecia Ray, , USA
Marcia Linn, UC Berkeley, USA
Knut Nuemann, IPN, Germany
Ross Nehm, University of Stony Brook, USA
Okhee Lee, University of New York, USA
Natalie King, Georgia State University, USA
Yizhu Gao, University of Georgia, USA
Gyeong-Geon Lee, National Institute of Education, Singapore
Jamie Mikeska, ETS,

Fireside Chat: Networking, Socializing, and Connecting Among the ISK-RIG Membership

25-Mar-25, 6:00 PM-7:00 PM
Location: Annapolis 1

Social Event
Organizers
Julie Robinson, University of North Dakota, Grand Forks, USA
Panelists
Bhaskar Upadhyay, University of Minnesota, USA
Pauline Chinn, University of Hawaii at Manoa, USA
Sharon Nelson-Barber, WestEd, USA

Writing a Winning Grant Proposal: Tips and Advice from API scholars

25-Mar-25, 6:00 PM-7:00 PM
Location: Azalea 1

Social Event
Organizers
Hosun Kang, University of California Irvine, USA
Edna Tan, University of North Carolina Greensboro, USA
Jennifer Tripp, University at Buffalo, USA
Peng He, Washington State University, Pullman, USA
Xiufeng Liu,University of Macau, China
Panelists
Okhee Lee, University of New York, USA
Li Ke, University of Nevada Reno, USA

Equity and Ethics DInner

25-Mar-25, 6:00 PM-9:00 PM
Location: Offsite

Social Event
Organizers
Iliana De La Cruz, Texas A&M University, College Station, USA
Dominick Fantacone, SUNY Cortland, USA

In-Person Conference
26 March 2025

NARST Fellows Breakfast
26-Mar-25, 7:00 AM-8:00 AM
Location: Magnolia 2

Social Event

Membership and Business Meeting
26-Mar-25, 8:00 AM-8:45 AM
Location: Cherry Blossom Ballroom

Expanding Horizons: Innovations in Science Outreach
26-Mar-25, 9:00 AM-10:30 AM
Location: Azalea 2

Administrative Session
Organizers
Cristina Guarrella, Australasian Science Education Research Association (ASERA), Australia
Linda Hobbs, Australasian Science Education Research Association (ASERA), Australia
Presenters
Cristina Guarrella, Australasian Science Education Research Association (ASERA), Australia
Linda Hobbs, Australasian Science Education Research Association (ASERA), Australia
Victoria Millar,The University of Melbourne, Australia
Kyla Adams, University of Western Australia, Perth, Australia

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Learning to live with the world: The role of science education
26-Mar-25, 9:00 AM-10:30 AM
Location: Baltimore 3

Administrative Session
Organizers
Lucy Avraamidou, University of Groningen, Netherlands
Giulia Tasquier, University of Bologna, Italy
Panelists
Katarina Gunter, Umea University, Sweden
Wonyong Park, University of Southampton, UK
Duru Bayram,Eindhoven University of Technology, Netherlands
Nayif Awad, Sakhnin Academic College For Teacher Education, Israel
Sara Wilmes, University of Luxembourgh, Luxembourg
Marta Romero Ariza, University of Jaén, Spain
Lama Jaber, Florida State University, USA
Felicia Moore Mensah, Teachers College, Columbia University, USA

From Data to Discourse: Enhancing Scientific Communication and Argumentation Skills

Strand 1: Science Learning: Development of student understanding
26-Mar-25, 9:00 AM-10:30 AM
Location: Azalea 3

Stand-Alone Paper

Does size matter? Dealing with diagrams presenting different data amounts when justifying scientific claims

Gregor Benz*, Technical University Munich, Germany
Tobias Ludwig, Karlsruhe University of Education, Germany
Andreas Vorholzer, Technical University Munich, Germany

Stand-Alone Paper

What makes you argue? Prompting students' arguments during an ecology class

Rena Orofino*, University of São Paulo, Brazil
Jenifer Xavier, EE. Profa Dinorah Silva dos Santos, Brazil
Melina Leite, University of São Paulo, Brazil
Daniela Scarpa, University of São Paulo, Brazil

Stand-Alone Paper

Reconnecting students' views of NOS to argumentation from an epistemological perspective

Jing Lin*, Beijing Normal University, China
Hongyan Zhao, Beijing Normal University, China
Letong Zhang, Renmin University of China, China
Xiaowei Tang, University of Macau, China

Building Science Understanding and Memory through Cultural Context and Interactions

Strand 2: Science Learning: Contexts, Characteristics and Interactions
26-Mar-25, 9:00 AM-10:30 AM
Location: Camellia 1

Stand-Alone Paper

Contextualizing Teaching of Genetic: Leveraging Culture and Technology for Enhanced Learning Outcomes

Franklin Onowugbeda, Lagos State University, Nigeria
Peter Okebukola*, Lagos State University Nigeria
Juma Shabani, University of Burundi, Burundi
Umar Adam, Lagos State University, Nigeria

Stand-Alone Paper

Impact of Childhood Spatial and Nonspatial Activity on Learner's Verbal and Visuospatial Working Memory Capacity

Seth Davis, University of Florida, USA
Muhammad Rehman*, University of Florida, USA
Do Hyong Koh*, University of Florida, USA
Christine Wusylko, University of Florida, USA
Xiaoman Wang,University of Florida, USA
Priya Prasad, University of Florida, USA
Pavlo Antonenko, University of Florida, USA
Kara Dawson, University of Florida, USA
Jonathan Martin, University of Florida, USA
Ellen Martin, University of Florida, USA

Stand-Alone Paper
Peer Interaction and Conceptual Development: A Multimodal Interaction Analysis
John Galisky*, UC Santa Barbara, USA

Strengthening Collaboration in Science Education

Strand 2: Science Learning: Contexts, Characteristics and Interactions
26-Mar-25, 9:00 AM-10:30 AM
Location: Camellia 2

Stand-Alone Paper
Exploring Students' Collaborative Regulation of Learning and Chemical Thinking During a Dynamic-Authentic Learning Experience
Noah Amir*, Technion – Israel Institute of Technology, Israel
Shirly Avargil, Technion – Israel Institute of Technology, Israel

Stand-Alone Paper
A Case Study of Fostering Positive Interdependence in Secondary Science Classrooms through Multimodal Collaborative Learning
Jiaxin Chen*, The University of Hong Kong, China
Jiaojiao Hui*, The University of Hong Kong, China
Guojun Xu, Hangzhou Yinhu Experimental Middle School, China
CHEN CHEN, The University of Hong Kong, China

Roundtables 3

26-Mar-25, 9:00 AM-10:30 AM
Location: Cherry Blossom Ballroom

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies
Roundtable
Developing a Framework to Characterize Talk Moves to Encourage Cross-Team Argument Critique in Engineering Discussions
Pamela Lottero-Perdue*, Towson University, USA
Jamie Mikeska, ETS, USA

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies
Roundtable
How Primary STEM Teaching Learning Support Student Readiness for Blended Learning: Six Teaching Profiles
Karlis Greitans*, University of Latvia, Latvia
Dace Namsone, University of Latvia, Latvia
Ildze Čakāne, University of Latvia, Latvia

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies
Roundtable
How Do French Kindergarten Teachers regulate the verbal interactions during explicit Scientific Inquiry-Based Sequences?
Estelle Blanquet*, INSPE of Bordeaux, France
Eric Picholle, INPHYNI, CNRS, France

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies
Roundtable
Linking Teacher Agency to Learning Orientation in Generative Environments: Insights from a Multiple Case Study
Jee Kyung Suh*, University of Alabama, USA
Jale Dursun, University of Alabama, USA
Brian Hand, University of Iowa, USA

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies
Roundtable
'They really matter!": Relationships' impact on elementary teachers' sense of agency for teaching science
Anica Miller-Rushing*, Associated Universities Inc., USA
Alison Mercier, University of Wyoming, USA

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies
Roundtable
Investigation of Disadvantaged Students' STEM Identity Development During Extracurricular STEM Activities
Guler Akkor, Aydin Adnan Menderes University, Turkey
Arzu Tanis Ozcelik*, Aydin Adnan Menderes University, Turkey

Strand 5: College Science Teaching and Learning (Grades 13-20)
WIP Roundtable
Competitors or Community: Attending to Social Networks to Disrupt the Status Quo in STEM
Sombo Koo, UC Davis, USA
Téa Pusey*, UC Davis, USA
José Oyola Cortes, UC Davis, USA
Becca VanArnam, UC Davis, USA
Andrew Hood,UC Davis, USA
Sanjana Dhamankar, UC Davis, USA
Theron Sowers, UC Davis, USA
Rebecca Ambrose, UC Davis, USA

Strand 5: College Science Teaching and Learning (Grades 13-20)
WIP Roundtable
Assessing the Impact of a Culturally Inclusive Teaching Institute for STEM Community College Faculty
Bernadette Sibuma*, Massachusetts Bay Community College, USA
Jayne Ryczkowski, Massachusetts Bay Community College, USA
Meredith Watts, Massachusetts Bay Community College, USA

Strand 5: College Science Teaching and Learning (Grades 13-20)
WIP Roundtable
Exploring Collective Activity in Mentoring Underrepresented Students within Undergraduate Research Programs in STEM
Hyoung Joon Park*, Oregon State University, USA
Jana Bouwma-Gearhart, Oregon State University, USA
Barbara Ettenauer, Oregon State University, USA

Strand 13: History, Philosophy, Sociology, and Nature of Science
Roundtable
Feminist Materialist Teaching Practices and the Conceptualization of Trust in Science Education
Anna Skorupa*, New York University, USA
Shaghig Chaparian*, New York University, USA
Leah Master*, New York University, USA

Catherine Milne*, New York University, USA

Strand 6: Science Learning in Informal Contexts
Roundtable
Exploring Childrens Environmental Identity in Third Spaces
Srijana Katuwal*, Ohio University, USA
Rejoice Vorsah, Ohio University, USA
Sara Salloum, Ohio University, USA
Danielle Dani, Ohio University, USA

Strand 6: Science Learning in Informal Contexts
Roundtable
Refiguring Identities: Cultivating Epistemic Agency in African American Students Through Engineering Practices in STEM
Lezly Taylor*, Virginia Tech, USA
George Glasson, Virginia Tech, USA
Brenda Brand, Virginia Tech, USA

Strand 6: Science Learning in Informal Contexts
WIP Roundtable
'Nature leads, and throws up questions for science to answer": Science and Natural Hair
Grace Tukurah*, Michigan State University, USA

Strand 7: Pre-service Science Teacher Education
WIP Roundtable
Improving Science Teaching: A Comparative Study of Online and Traditional Science Methods Course Modalities
Burak Sahin*, University of Nevada, Las Vegas, USA
Maizie Dyess, University of Nevada, Las Vegas, USA
Katherine Wade-Jaimes, University of Nevada, Las Vegas, USA

Strand 7: Pre-service Science Teacher Education
WIP Roundtable
Preservice teachers' understanding of NGSS-aligned science instruction measured by a modified SIPS survey
Youngjin Song*, California State University Long Beach, USA
Sara Dozier, California State University Long Beach, USA
Lisa Martin-Hansen*, California State University Long Beach, USA
Thao Tran, California State University East Bay, USA
Michele Korb,California State University East Bay, USA

Strand 7: Pre-service Science Teacher Education
WIP Roundtable
Encouraging Pre-Service Teachers to Embrace STEM Education through Multidisciplinary Collaborations
UrLeaka Newsome*, Tennessee State University, USA
Catherine Armwood-Gordon, Tennessee State University, USA
Reniece Mashburn, Tennessee State University, USA

Strand 5: College Science Teaching and Learning (Grades 13-20)
WIP Roundtable
Investigating undergraduate biology students understanding of plant physiology using concept inventory
Meena Kharatmal*, Homi Bhabha Centre for Science Education (Tata Insittute of Fundamental Research), India
Mayur Gaikwad, Sophia College, India
Aashutosh Mule, Somaiya College, India

Strand 8: In-service Science Teacher Education
Roundtable
Influences and expressions of in-service elementary teacher agency for science: Deeply considering the SETSA framework
Anica Miller-Rushing*, Associated Universities Inc., USA
Alison Mercier, University of Wyoming, USA

Strand 8: In-service Science Teacher Education
Roundtable
A Systematic Review of Equity-Centered Mentoring for PreK-12 Science Educators
Raju Ahmmed*, University of Houston, USA
Sissy Wong, University of Houston, USA

Strand 8: In-service Science Teacher Education
Roundtable
Strengthening Elementary STEM Teacher Identity through Quantum Content and Curriculum
Nancy Holincheck*, George Mason University, USA
Jennifer Simons*, George Mason University, USA
Stephanie Dodman, George Mason University, USA
Xiaolu Zhang, George Mason University, USA
Jessica Rosenberg*,George Mason University, USA
Benjamin Dreyfus, George Mason University, USA
Julia Lipman, George Mason University, USA

Strand 8: In-service Science Teacher Education
WIP Roundtable
Using an intersectional approach to uncover inequities in access to research experience for teachers programs
Amanda Morrison*, Oregon State University, USA

Strand 8: In-service Science Teacher Education
WIP Roundtable
Examining Critical Reflexivity in STEM Career Change Teachers
Jennifer Simons*, George Mason University, USA

Strand 11: Cultural, Social, and Gender Issues
Engineering as Culturally Responsive Science Education Amidst CRT and DEI Prohibitions
Christopher Irwin*, Florida International University, USA
Berry Lamy, Florida International University, USA
Joshua Ellis, Louisiana State University`, USA
Andrew Green, Engineering For Us All, USA
Nicholas Oehm,Florida International University, USA
Darryl Dickerson, Florida International University, USA

Strand 11: Cultural, Social, and Gender Issues
Roundtable
Towards a Science Education Chimera and Possibilities for Professional Learning
Linsey Brennan*, Michigan State University, USA

Terrance Burgess, Michigan State University, USA

Strand 11: Cultural, Social, and Gender Issues
WIP Roundtable
Implications for Black Individuals in STEM within the Mid-Atlantic Region: A Systematic Literature Review
Jess Edwards*, American University, USA
Martinique Sealy, American University, USA
Shari Watkins, American University, USA
Brian McGowan, American University, USA
Ihsan Hawkins,American University, USA
Zaki Hawkins, American University, USA

Strand 11: Cultural, Social, and Gender Issues
WIP Roundtable
Catalytic catharsis: breaking the self-perpetuating cycle of unchanging white anti-racism in science education
Michael Nocella*, University of Illinois Chicago, USA

Strand 11: Cultural, Social, and Gender Issues
WIP Roundtable
We Are Empowered! The Positionality of Black Women Science Teachers to Engage Black Girls
Teresa Massey*, Georgia State University, USA

Strand 11: Cultural, Social, and Gender Issues
WIP Roundtable
Translanguaging in Science Classrooms: Student Perspectives on and Identity Outcomes of Using Multilingualism in Science
Alexis Rutt*, University of Mary Washington, USA
Erich Sneller, Harrisonburg City Public Schools, USA
Elizabeth Hunter, Harrisonburg City Public Schools, USA

Strand 11: Cultural, Social, and Gender Issues
Roundtable
Exploring how language is framed to describe impostor phenomenon in STEM fields
Devasmita Chakraverty*, Indian Institute of Management Ahmedabad, India

Strand 11: Cultural, Social, and Gender Issues
WIP Roundtable
Is it culturally responsive teaching if the teacher does not call it that?
Elaine Howes*, American Museum of Natural History, USA
Jamie Wallace*, American Museum of Natural History, USA

Strand 11: Cultural, Social, and Gender Issues
WIP Roundtable
Science and language: how can we support student integration?
Maiza de Albuquerque Trigo*, University of Luxembourg, Luxembourg
Pit Lepage, Ministry of Education, Luxembourg
Thierry Frentz, Ministry of Education, Luxembourg

Strand 11: Cultural, Social, and Gender Issues
WIP Roundtable
Examining Culturally Relevant Dispositions in District Science Coordinators and Science Teachers

Meredith Schwendemann*, Clemson University, USA
Brooke Whitworth, Clemson University, USA
Julie Luft, University of Georgia, USA

Strand 15: Policy, Reform, and Program Evaluation
Roundtable
A Case for Elevating Community STEM Brilliance Beyond the Pipeline in Global Policy Discourses
Meredith Bittel*, University of Kansas, USA
Alexander Bittel*, University of Kansas, USA

Strand 15: Policy, Reform, and Program Evaluation
WIP Roundtable
Leader Identity Construction of Science Teachers who use Social Media to Advocate for Science Education
Rachel Benzoni*, University of Nebraska-Lincoln, USA

Reshaping traditional science teaching methods to deepen student understanding and engagement

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies
26-Mar-25, 9:00 AM-10:30 AM
Location: Baltimore 4

Stand-Alone Paper
The Potential of an "Epistemic Boost" to Support Student Belonging in Science
Corinne Singleton*, University of Colorado Boulder, USA
William Penuel, University of Colorado Boulder, USA
Anna-Ruth Allen, University of Colorado Boulder, USA
Clarissa Deverel-Rico, University of Colorado Boulder, USA
Andrew Krumm,2 School of Information and Michigan Medicine, University of Michigan, USA
Carol Pazera, 3 Charles A. Dana Center, University of Texas, Austin, USA

Stand-Alone Paper
System Thinking Approach in Fostering Students' Understanding of the Concept of Chemical Equilibrium
Guluzar EYMUR*, Giresun University, Turkey

Stand-Alone Paper
Recognized and Realigned: A Veteran Teacher's Moves to Realign Familiar Forms of Epistemic Agency
Christine Hirst Bernhardt*, University of Maryland, USA
Andrew Elby, University of Maryland, USA

Stand-Alone Paper
Variations in Epistemological Messaging in High School Biology
Cynthia Passmore*, University of California, Davis, USA
Hessam Ghanimi, University of California, Davis, Saint-Barthélemy
Cari Hermann-Abell, BSCS Science Learning, USA
Patricia Olson, BSCS Science Learning, USA
Jeffrey Snowden,BSCS Science Learning, USA
Molly Stuhlsatz, BSCS Science Learning, USA
Chris Wilson, BSCS Science Learning, USA

Stand-Alone Paper
Multiple Case Studies of Middle School Students' Epistemic Practices of Engineering During Integrated STEM Unit
Muhammad Purwanto*, University of Minnesota-Twin Cities, USA
Gillian Roehrig, University of Minnesota-Twin Cities, USA
Jeanna Wieselmann, Southern Methodist University, USA

NARST Connects
26-Mar-25, 10:45 AM-12:15 PM
Location: Baltimore 5

Discussion Session
This is a time for conference attendees to connect and discuss professionally related topics of their choosing. There are no designated presenters or moderators.

Instructor Supports and Strategies for Implementing Student-Centered Instruction
Strand 5: College Science Teaching and Learning (Grades 13-20)
26-Mar-25, 9:00 AM-10:30 AM
Location: Magnolia 3

Stand-Alone Paper
Findings from the Implementation of a Learning Community for Science Faculty
Peter Cormas*, Pennsylvania Western University, USA
Min Li, Pennsylvania Western University, USA
Louise Nicholson, Pennsylvania Western University, USA
Kyle Fredrick, Pennsylvania Western University, USA
Elizabeth Steiner,RAND Corporation, USA
Sy Doan, RAND Corporation, USA
Rebecca Wolfe, RAND Corporation, USA

Stand-Alone Paper
Science Student-Teacher Perceptions of the Project-Based Learning (PjBL) Model: A Phenomenological Study with Graduate-Level Students
Isabel Delgado*, University of Puerto Rico-Rio Piedras, Puerto Rico
Emanuel Santos*, University of Puerto Rico-Rio Piedras, Puerto Rico

Stand-Alone Paper
Planning to Fail: Teaching Strategies to Navigate Failure-Related Research Challenges in an Introductory Biology CURE
Joseph Harsh*, James Madison University, USA
Gabrielle Gauldin, James Madison University, USA
Isobel Cobb, James Madison University, USA
Sarah Coleman, James Madison University, USA
Emma Powell,James Madison University, USA
Charlotte Stewart, James Madison University, USA
Julie Cumins, James Madison University, USA
Brett Chappell, James Madison University, USA
Lisa Corwin, University of Colorado - Boulder, USA
Oliver Hyman, James Madison University, USA

Stand-Alone Paper
Exploring Instructor Autonomy Support in Student-Centered College Biology Classrooms
Kimberly Pigford*, North Carolina Agricultural and Technical State University, USA
Miriam Ferzli, North Carolina State University, USA
Margaret Blanchard, North Carolina State University, USA

Empowering agency to support Teaching and Learning

Strand 7: Pre-service Science Teacher Education
26-Mar-25, 9:00 AM-10:30 AM
Location: Baltimore 2

Stand-Alone Paper
Empowering Future Educators: Pre-Service Elementary Teachers' Self-Efficacy related to Equitable Science Instruction
Lillian Bentley*, Georgia State University, USA

Stand-Alone Paper
Empowering International Science Teacher Candidates (ISTC) to Become Agentive Contributors
Moyu Zhang*, Indiana University, USA

Stand-Alone Paper
Agency and the two-worlds problem: What emerges from an asset-based understanding of preservice teachers' learning.
Ryan Coker*, Florida State University, USA
Lama Jaber, Florida State University, USA
Sherry Southerland, Florida State University, USA

Stand-Alone Paper
A Framework for Supporting Reform-Oriented Storyline Instruction in Preservice Science Methods Courses
Benjamin Lowell*, New York University, USA
Sage Andersen, University of Texas at Austin, USA
María González-Howard, University of Texas at Austin, USA

Epistemic Orientations and Scientific Sensemaking

Strand 7: Pre-service Science Teacher Education
26-Mar-25, 9:00 AM-10:30 AM
Location: Baltimore 1

Stand-Alone Paper
Preservice science teacher educators' language orientations for scientific sensemaking
María González-Howard*, The University of Texas at Austin, USA
Sage Andersen, The University of Texas at Austin, USA
Leticia Garza, The University of Texas at Austin, USA
Nazia Tasnim, The University of Texas at Austin, USA

Stand-Alone Paper
EPISTEMIC ORIENTATIONS OF PRE-SERVICE SCIENCE TEACHERS IN A SCIENCE METHODS COURSE
Yetunde Adaramola*, Washington State University, USA
Omowumi Frieyo*, Washington State University, USA

Patrick Ochieng*, Washington State University, USA
Andy Cavagnetto, Washington State University, USA

Stand-Alone Paper
Secondary Pre-Service Science Teachers' Learning to Use Students' Ideas
Nessrine Machaka*, University of Illinois at Urbana Champaign, USA
Christina Krist*, Stanford University, USA

Stand-Alone Paper
Examining how teachers support students' equitable science sensemaking: A review of the literature from 2012-2024
Carrie-Anne Sherwood*, Southern Connecticut State University, USA
Amanda Benedict-Chambers*, Missouri State University, USA

Transforming Teacher Perspectives for Innovative Science Education Implementation

Strand 8: In-service Science Teacher Education
26-Mar-25, 9:00 AM-10:30 AM
Location: Annapolis 3

Stand-Alone Paper
Shifting Teachers' Conceptions from Models of to Models for: Curriculum Materials, Professional Development, and Implementation
Katherine Glover*, North Carolina State University, USA
Grace Carroll, North Carolina State University, USA
Jobie White, North Carolina State University, USA
Elizabeth Kluckman, North Carolina State University, USA
Soonhye Park,North Carolina State University, USA
Laura Chalfant, North Carolina State University, USA
Scott Ragan, North Carolina State University, USA
Jason Painter, North Carolina State University, USA

Stand-Alone Paper
Investigating the Support for Science Teacher Noticing on Reform-based Practices
Yuxi Huang*, University of California, Irvine, USA
Joseph Deluca, University of Georgia, USA
Ella Yonai, University of Georgia, USA
Xinyu He, University of Georgia, USA
Elizabeth Ayano,University of Georgia, USA
Julie Luft, University of Georgia, USA
Brooke Whitworth, Clemson University, USA

Stand-Alone Paper
Cultivating Teachers' Asset-Based Orientation for Implementing 3D Assessments
Miray Tekkumru-Kisa*, RAND, USA
Jill Wertheim*, WestEd, USA
Jennifer Richards, Northwestern University, USA

Stand-Alone Paper
Exploring teachers perceptions and beliefs about implementing socio-scientific issues using the Repertory Grid Technique
Yael Shwartz, Weizmann Institute of Science, Israel
Emil Eidin*, University of Wyoming, USA
Asaf Salman, Weizmann Institute of Science, Israel

Evolving Partnership to Advance Earth Science Across a Large District's Biology, Chemistry, and Physics Courses
Strand 10: Curriculum and Assessment
26-Mar-25, 9:00 AM-10:30 AM
Location: Magnolia 1

Related Paper Set
The Evolution of Teacher Collaboration and Leadership in a Research-Practice Partnership
Alan Berkowitz*, Cary Institute of Ecosystem Studies, USA
Kevin Garner, Baltimore City Public Schools, USA
Edmund Mitzel, Baltimore City Public Schools, USA
Beth Covitt, University of Montana, USA
Angela Hood,Cary Institute of Ecosystem Studies, USA
Carolyn Parker, American University, USA
Lauren Browning, George Washington University, USA
Jonathon Grooms, George Washington University, USA

Related Paper Set
Teachers Views About Integrating Earth Science Into High School Biology, Chemistry and Physics Curriculum
Lauren Browning*, George Washington University, USA
Annie Caires, University of Montana, USA
Beth Covitt, University of Montana, USA
Jonathon Grooms, George Washington University, USA

Related Paper Set
Partnership Participation and Teachers Changing Views of Reform Science Teaching
Jonathon Grooms*, George Washington University, USA
Lauren Browning*, George Washington University, USA
Annie Caires, University of Montana, USA
Beth Covitt, University of Montana, USA
Alan Berkowitz,Cary Institute of Ecosystem Studies, USA

Related Paper Set
Cultivating Assessment Elements to Support 3D Learning Within a Complex District Landscape
Beth Covitt*, University of Montana, USA
Kevin Garner, Baltimore City Public Schools, USA
Lauren Browning, The George Washington University, USA
Angela Hood, Cary Institute of Ecosystem Studies, USA
Alan Berkowitz,Cary Institute of Ecosystem Studies, USA
Edmund Mitzel, Baltimore City Public Schools, USA

Explorations of Positioning Theory Constructs in Science Education Research Centering Equity and Justice

Strand 11: Cultural, Social, and Gender Issues
26-Mar-25, 9:00 AM-10:30 AM
Location: Annapolis 4

Symposium
Explorations of Positioning Theory Constructs in Science Education Research Centering Equity and Justice
Maria Varelas*, University of Illinois Chicago, USA
Felicia Mensah*, Teachers College, Columbia University, USA
Maria Rivera Maulucci*, Barnard College, USA
Jrène Rahm*, Université de Montréal, Canada
Laura Zangori*,University of Missouri, USA
Eli Tucker-Raymond*, Boston University, USA
Tammie Visintainer, San José State University, USA
Jenny Martin*, Australian Catholic University, Australia
Ayça Fackler, University of Missouri, USA
Molly Botkin, University of Missouri, USA
Troy Sadler, University of North Carolina, USA
Katherine Frankel, Boston University, USA
Xi "CiCi" Yu, Boston University, USA
Maria Olivares, Boston University, USA
Ferdous Touioui, University of Montreal,
Stephanie Batres Spezza, University of Illinois Chicago, USA

Understanding Ethical Decision-Making Through Equity Frames Across Science Contexts

Strand 11: Cultural, Social, and Gender Issues
26-Mar-25, 9:00 AM-10:30 AM
Location: Annapolis 1

Related Paper Set
How Design Dilemmas are Helping Teachers Grapple with Racial and Social Equity in Science Curriculum
Katarzyna Pomian Bogdanov*, Northwestern University, USA

Related Paper Set
Ethical commitments to equitable and inclusive teaching of pre-service teachers
Ronan Rock*, Univeristy of Illinois Chicago, USA

Related Paper Set
Ethical and Historical Considerations as Design Dilemmas in Transfer Task Development
Nicole Vick*, Northwestern University, USA
Daniel Voss, Northwestern University, USA

Cognitive and Emotional Aspects in STEM Education

Strand 12: Technology for Teaching, Learning, and Research
26-Mar-25, 9:00 AM-10:30 AM
Location: Baltimore 5

Stand-Alone Paper
How Textual Features Interact with Cognitive Factors: Environmental Cognitive Augmentation Using AI
Richard Lamb*, University of Georgia, USA

Christine Brugh, Laboratory of Analytic Sciences, USA
Lori Wachter, Laboratory of Analytic Sciences, USA
Steohen Shauger, Laboratory of Analytic Sciences, USA
Bo Light,Laboratory of Analytic Sciences, USA
Kenneth Thompson, Laboratory of Analytic Sciences, USA

Stand-Alone Paper

First-year STEM undergraduates at an HBCU: Less Course Tech, More Role Stress

Elizabeth Deimeke*, Clark Atlanta University, USA
Renee Schwartz, Georgia State University, USA

Stand-Alone Paper

Integrating Harlybot with CTCA: Enhancing Learners' Retention, Motivation, and Attitudes in ICT and STEM Education

Alli Abdurrazaq, Lagos State University, Nigeria
Olugbenga Akindoju, Lagos State University, Nigeria
Hakeem Olatoye, Lagos State University, Nigeria
Peter Okebukola, Lagos State University, Nigeria
Sanni Rasheed, Lagos State University, Nigeria

Advancing Science Pedagogy: Insights from Inquiry, Practices, and Differentiated Approaches

Strand 2: Science Learning: Contexts, Characteristics and Interactions
26-Mar-25, 10:45 AM-12:15 PM
Location: Camellia 1

Stand-Alone Paper

Science Content to Practice: Investigating Middle-Grade Students Views About Inquiry and Science and Engineering Practices

Alex St. Louis*, Augusta University, USA
Savannah Hayes*, University of Houston, USA
Taylor Kate Guerrero*, Augusta University, USA

Stand-Alone Paper

A Systematic Review of High Impact Review Studies in STEM Education

YURDAGÜL BOĞAR*, Hakkari University, Turkey

Stand-Alone Paper

Model-based Inference as a Source of Agency in Scientific Explanation

Jonathan Shemwell*, University of Alabama, USA
Daniel Capps*, University of Georgia, USA
Daniel Pimentel*, University of Alabama, USA

Stand-Alone Paper

Comics in STEM aren't Superior to Traditional Worksheets

Marc Rodemer*, University of Duisburg-Essen, Germany
Nils Ullenboom, University of Duisburg-Essen, Germany

New Approaches to Understanding Classroom Culture in Science Classrooms

Strand 2: Science Learning: Contexts, Characteristics and Interactions
26-Mar-25, 10:45 AM-12:15 PM
Location: Camellia 2

Related Paper Set
Simultaneously addressing epistemic and relational aspects of classroom activity: A teacher's opportunities and challenges
Annabel Stoler*, Boston University, USA
Eve Manz, Boston University, USA

Related Paper Set
Children's Voices on Classroom Norms: Understanding Second Graders' Experiences in Collaborative Science Learning
Souhaila Nassar*, Boston University, USA
Eve Manz, Boston University, USA

Related Paper Set
Relational messaging as a support for the collective enterprise of purposeful sensemaking in science classrooms
Jason Buell*, Northwestern University, USA
William Penuel, University of Colorado Boulder, USA
Chris Griesemer, University of California, Davis, USA
Yang Zhang, Northwestern University, USA
Jessica Alzen,University of Colorado Boulder, USA
Cynthia Passmore, University of California, Davis, USA
Kelsey Edwards, Northwestern University, USA
Brian Reiser, Northwestern University, USA

Related Paper Set
How college students experience a physics course designed to support collective learning
Eric Kuo*, University of Illinois Urbana-Champaign, USA
Christina Krist, Stanford University, USA

Identity, Belonging, and Cultural Capital in STEM

Strand 5: College Science Teaching and Learning (Grades 13-20)
26-Mar-25, 10:45 AM-12:15 PM
Location: Magnolia 3

Stand-Alone Paper
Assessing Identity, Belonging, and Impostorism for Interdisciplinary Graduate Education
M. Gail Jones*, NC State University, USA
Alicia Fischer, NC State University, USA
Shiyan Jiang, NC State University, USA
Madeline Stallard, NC State University, USA

Stand-Alone Paper
Graduate STEM Students as Role Models for High School Students
Ana-Maria Topliceanu*, North Carolina State University, USA
Katherine McCance*, University of Texas at San Antonio, USA
Margaret Blanchard*, North Carolina State University, USA
Jennifer Sollinger*, North Carolina State University, USA

Stand-Alone Paper
Bridging families: Leveraging first-generation, familial, and filial piety cultural capitals in Physics classrooms

Lucia Hau, San Francisco State University, USA
Khanh Tran*, Purdue University, USA
Elleanor Pangilinan, San Francisco State University, USA
Alegra Eroy-Reveles, University of California, Santa Cruz, Uganda
Kim Coble,San Francisco State University, USA

Innovations In Quantitative Assessment Frameworks And Methodologies In Undergraduate Biology Education

Strand 5: College Science Teaching and Learning (Grades 13-20)
26-Mar-25, 10:45 AM-12:15 PM
Location: Magnolia 1

Related Paper Set
Can Large Language Models outperform Machine Learning auto-scoring models? Efficacy tests using text-based scientific explanations
Yunlong Pan*, Stony Brook University, USA
Ross Nehm, Stony Brook University, USA

Related Paper Set
Quantitative frameworks for assessing equity in undergraduate classrooms: comparing learning across traditional/reformed instructional contexts
Benjamin Hechtman*, Stony Brook University, USA
Gena Sbeglia, San Diego State University, USA
Ross Nehm, Stony Brook University, USA

Related Paper Set
Uncovering Educational Inequalities with Feature Manifold Transformers, a New Way to Interpret Complex Feature Interactions
Derrick Cox*, Wright State University, USA
Tanvi Banerjee, Wright State Universit, USA
William Romine, Kairos Research, LLC, USA

Related Paper Set
Quantitative assessment of the relationship between evolutionary conflict perception and high doses of evidence-based instruction
Audrey Johnson*, San Diego State University, USA
Gena Sbeglia, San Diego State University, USA

Description of a Place-Based, Informal Science Learning Experience at the Great Dismal Swamp

Strand 6: Science Learning in Informal Contexts
26-Mar-25, 10:45 AM-12:15 PM
Location: Baltimore 4

Related Paper Set
A Literature Review of African American Informal STEM Learning
Jomo Mutegi*, Old Dominion University, USA
Seth Cudjoe, Old Dominion University, USA

Related Paper Set
Using Socially Transformative Curriculum to Design a Placed-Based Informal STEM Learning Experience
Seth Cudjoe*, Old Dominion University, USA

Jomo Mutegi, Old Dominion University, USA
Robert Atkinson, Christopher Newport University, USA

Related Paper Set

Exploring the Impact of an Informal STEM Learning Experience through Narrative Inquiry.

Mujibat Akorede*, Old Dominion University, USA
Seth Cudjoe, Old Dominion University, USA
Umar Adams, Lagos State University, Nigeria
Jomo Mutegi, Old Dominion University, USA

Related Paper Set

Participant Voices: What I Learned as an Intern in the Great Dismal Swamp.

Mujibat Akorede*, Old Dominion University, USA
Liliana Boyd, Lakeland High School, USA
Pearl Kmutia, Kings Fork High School, USA
Kay Adams, Friends of the Great Dismal Swamp National Wildlife Refuge, USA
Jomo Mutegi,Old Dominion University, USA

Approaches of Developing Self-efficacy for STEM Teaching and Learning

Strand 7: Pre-service Science Teacher Education
26-Mar-25, 10:45 AM-12:15 PM
Location: Baltimore 1

Stand-Alone Paper

What is STEM? Preservice Elementary Teachers' Conceptions of Integrated STEM Instruction

Jeanna Wieselmann*, Southern Methodist University, USA
Deepika Menon, University of Nebraska - Lincoln, USA
Brynn Price, Southern Methodist University, USA
Allison Johnson, University of Nebraska - Lincoln, USA
Sumreen Asim,Indiana University Southeast, USA
Sarah Haines, Towson University, USA

Stand-Alone Paper

Analyzing Item Endorsement Difficulty of the Engineering Teaching Efficacy Beliefs Instrument Using Wright Maps

Ezgi Yesilyurt*, Weber State University, USA
Erdogan Kaya*, George Mason University, USA
Hasan Deniz, University of Nevada, Las Vegas, USA

Stand-Alone Paper

Improving STEM-EL Instruction: Replicating and Evaluating a Specialized Teacher Training Program for Future Educators

Catherine Lussier*, University of California, Riverside, USA
Melissa Klaib, University of California, Riverside, USA

Jack Eichler, University of California, Riverside, USA
Leslie Bushong, University of California, Riverside, USA

Stand-Alone Paper
Investigating Elementary Preservice Teachers' STEM Self-Efficacy
Arzu Tanis Ozcelik*, Aydin Adnan Menderes University, Turkey

Approaches to Exploring Preservice Teachers' Learning and Teaching

Strand 7: Pre-service Science Teacher Education
26-Mar-25, 10:45 AM-12:15 PM
Location: Baltimore 2

Stand-Alone Paper
The Role of the Lesson Study on the Development of Pre-service Chemistry Teachers' Self-reflection
Esra SARICI*, Middle East Technical University, Turkey
Esen KONDAKCI, Middle East Technical University, Turkey

Stand-Alone Paper
Unpacking Contradictions in Elementary Preservice Teachers' Science Planning and Teaching
Felisha Dake*, Oregon State University, USA
Cory Buxton, Oregon State University, USA

Striving to Transform STEM Education through Social Justice and Socioscientific Issues: Insights from Professional Development

Strand 8: In-service Science Teacher Education
26-Mar-25, 10:45 AM-12:15 PM
Location: Annapolis 3

Related Paper Set
Striving forward: Findings from an SSI focused STEM professional development
Joseph Johnson*, Mercyhurst University, USA
Charu Varma, Arcadia University, USA
Eva Henneman, Mercyhurst University, USA
Eli Louis, Mercyhurst University, USA

Related Paper Set
Reimagining and Reframing STEM Instruction: Addressing Diverse Learners Using a Socioscientific and Social Justice Framework
Greer Richardson*, La Salle University, USA
Becky Mathers, Arcadia University, USA
Joseph Johnson, Mercyhurst University, USA
Lisa Marco-Bujosa, Villanova University, USA
Ling Liang,La Salle University, USA

Related Paper Set
Problematizing SSIs for Justice
Zachary Minken*, Arcadia University, USA

Related Paper Set
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Sanaa Jett, Villanova University, USA
Becky Mathers, Arcadia University, USA
Nicholas Kennedy, Villanova University, USA

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Developing student agency: Authentic application of SSI in STEM classrooms

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Alan Kaufman, Arcadia University, USA
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Eli Lois,Mercyhurst University, USA
Eva Henneman, Mercyhurst University, USA

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Strand 11: Cultural, Social, and Gender Issues
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Race Critical Listening: A Precursor to an Afrofuturistic Climate-Environmental Justice Literacy

Terrell Morton*, University of Illinois Chicago, USA
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Supporting Justice-Centered Science Teaching and Learning Across Varied Contexts

Strand 11: Cultural, Social, and Gender Issues
26-Mar-25, 10:45 AM-12:15 PM
Location: Annapolis 2

Related Paper Set
Exploring Intersectional Climate Change Identity of Women of Color Preservice Elementary Teachers
Amal Ibourk*, Florida State University, USA
Lauren Wagner, University of North Alabama, USA
Sukanya Chakraborty, Florida State University, USA

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Natalie Rae*, Penn State University, USA

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Kelsea Frazier, Columbus City Schools, USA
Elena Silverman, Indiana University Indianapolis, USA

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Justice-Centered STEM Education to Address Pressing Societal Challenges
Okhee Lee*, New York University, USA

Related Paper Set
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Karen Woodruff*, Kean University, USA
Mario Sanivanez, Hackensack High School, USA
Brooke Zwier, Hackensack High School, USA
Benjamin Keeler,Hackensack High School, USA

Related Paper Set
Anti-Racist Ambitious Science Teaching as an Organizational Structure to Support Preservice Teacher Learning
Jennifer Jackson, Oak Ridge Institute for Science and Education, USA
Jonathan McCausland, Iona University, USA
Scott McDonald, Pennsylvania State University, USA

Climate Justice

Strand 14: Environmental Education and Sustainability
26-Mar-25, 10:45 AM-12:15 PM
Location: Baltimore 3

Stand-Alone Paper

Elementary Climate Education: A Framework for Including Climate Justice in Climate Emergency Lessons

Hong Tran*, Purdue University, USA
Joseph DeLuca, University of Georgia, USA
Shweta Lahiri, University of Georgia, USA
Emily Adah Miller, University of Georgia, USA
Ajay Sharma,University of Georgia, USA
Erin Hamel, University of Georgia, USA
Peng He, Washington State University, Pullman, USA
Yuxi Huang, University of California, Irvine, USA
Tingting Li, Washington State University, Pullman, USA
Julie Luft, University of Georgia, USA

Stand-Alone Paper

De-Naturalizing Climate Disasters Through Justice-Oriented Science Education

Wonyong Park*, University of Southampton, United Kingdom
Noemi Waight, University at Buffalo, USA
Fatemeh Mozaffari, University at Buffalo, USA
Jennifer Tripp, University at Buffalo, USA
Christopher St. Vil,University at Buffalo, USA

Stand-Alone Paper

Math as a Tool for Advocacy: Teachers' Quantitative Moral Moves During Climate Justice Activities

Helen Fitzmaurice*, UC Berkeley, USA
Michelle Wilkerson, UC Berkeley, USA
Jacob Barton, UC Berkeley, USA
Alyssa Sayavedra, CSU Monterey Bay, USA

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