

NARST 2013

Annual International Conference

The S in STEM Education: Policy,
Research and Practice

Wyndham Río Mar
Río Grande, Puerto Rico
April 6-9, 2013



Science Education

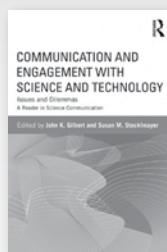
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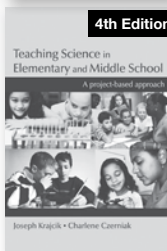
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Design, Make, Play

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Forthcoming:

Teaching Science in Elementary
and Middle School

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The S in STEM Education: Policy, Research and Practice

ACKNOWLEDGMENTS

The following members of the Program Committee helped in preparing and editing the 2013 NARST Annual International Conference Program Book.

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Lynn A. Bryan, President-Elect and Program
Committee Co-Chair

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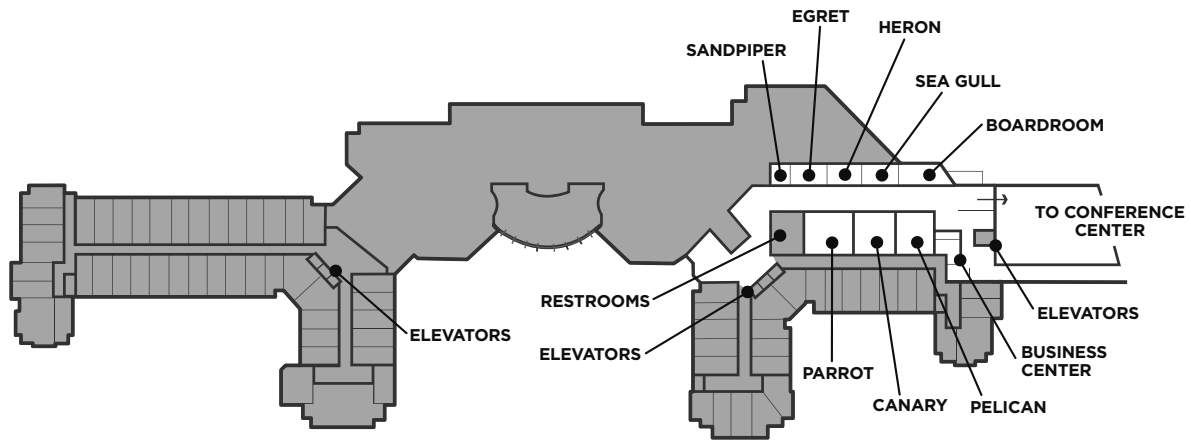
Toni A. Sondergeld, NARST Scheduling Coordinator

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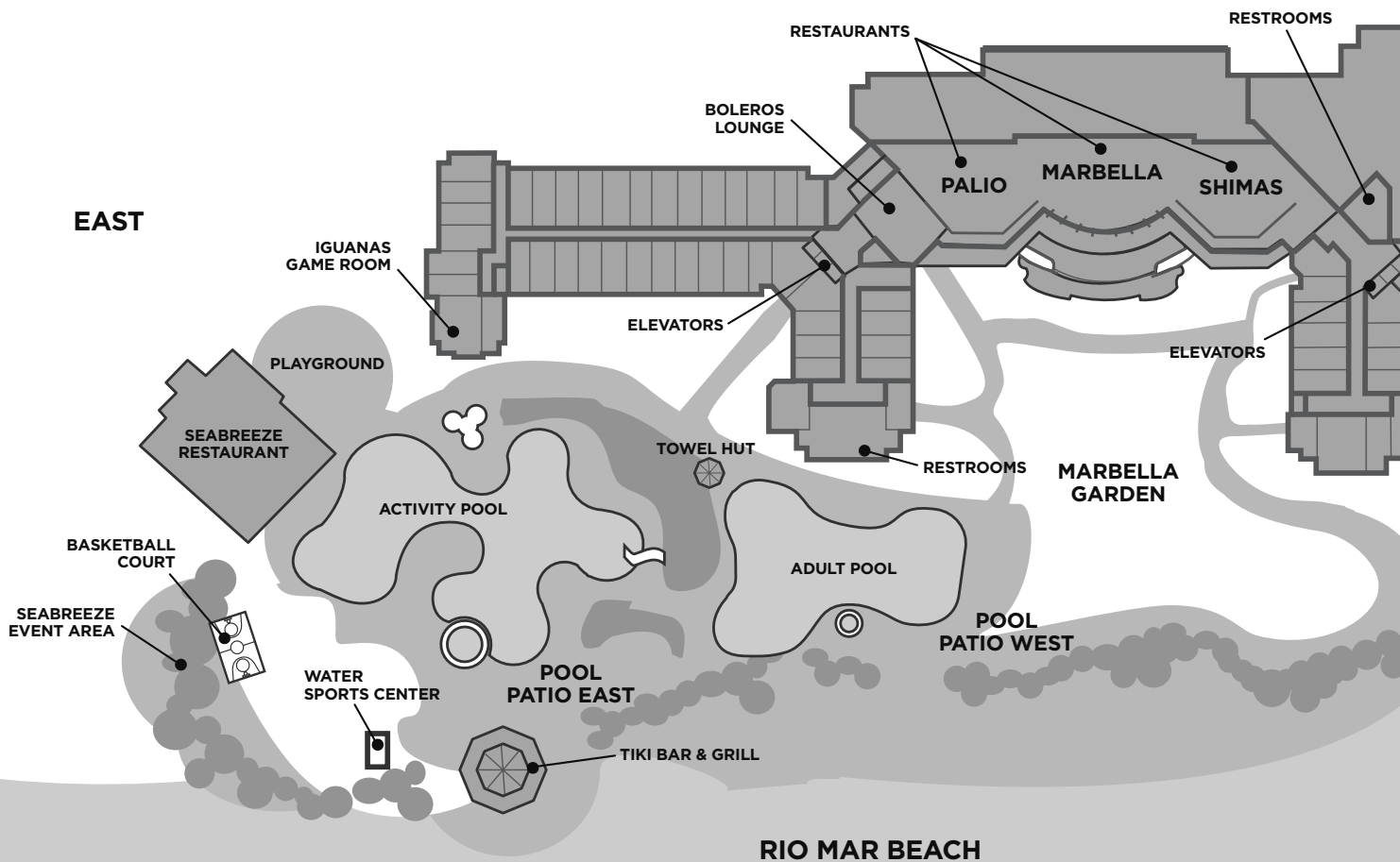
Table of Contents

- XX Hotel Floor Plans
- XX General Information
- XX Information about NARST and NARST Mission Statement
- XX Member Benefits
- XX Explanation of Program Session Formats
- XX Guidelines for Meeting Presenters
- XX Guidelines for Presiders and Discussants
- XX Strand Key
- XX Exhibits-Sponsors and Publishers
- XX NARST Leadership Team
- XX 2014 NARST Annual International Conference
- XX Future Meeting Dates
- XX Strand Coordinators
- XX Program Proposal Reviewers
- XX NARST Presidents
- XX NARST Executive Directors
- XX JRST Editors
- XX NARST Emeritus Members
- XX NARST Award Winners
- XX Distinguished Contributions to Science Education through Research
- XX JRST Award
- XX Outstanding Paper Award
- XX Outstanding Doctoral Research Award
- XX Early Career Research Award
- XX Outstanding Master's Thesis Award
- XX Classroom Applications Award
- XX NARST Leadership Team and Committees
- XX Schedule at a Glance
- XX Annual Meeting Program by Date and Time
- XX Abstracts – Now on CD
- XX Author Index

LEVEL 2

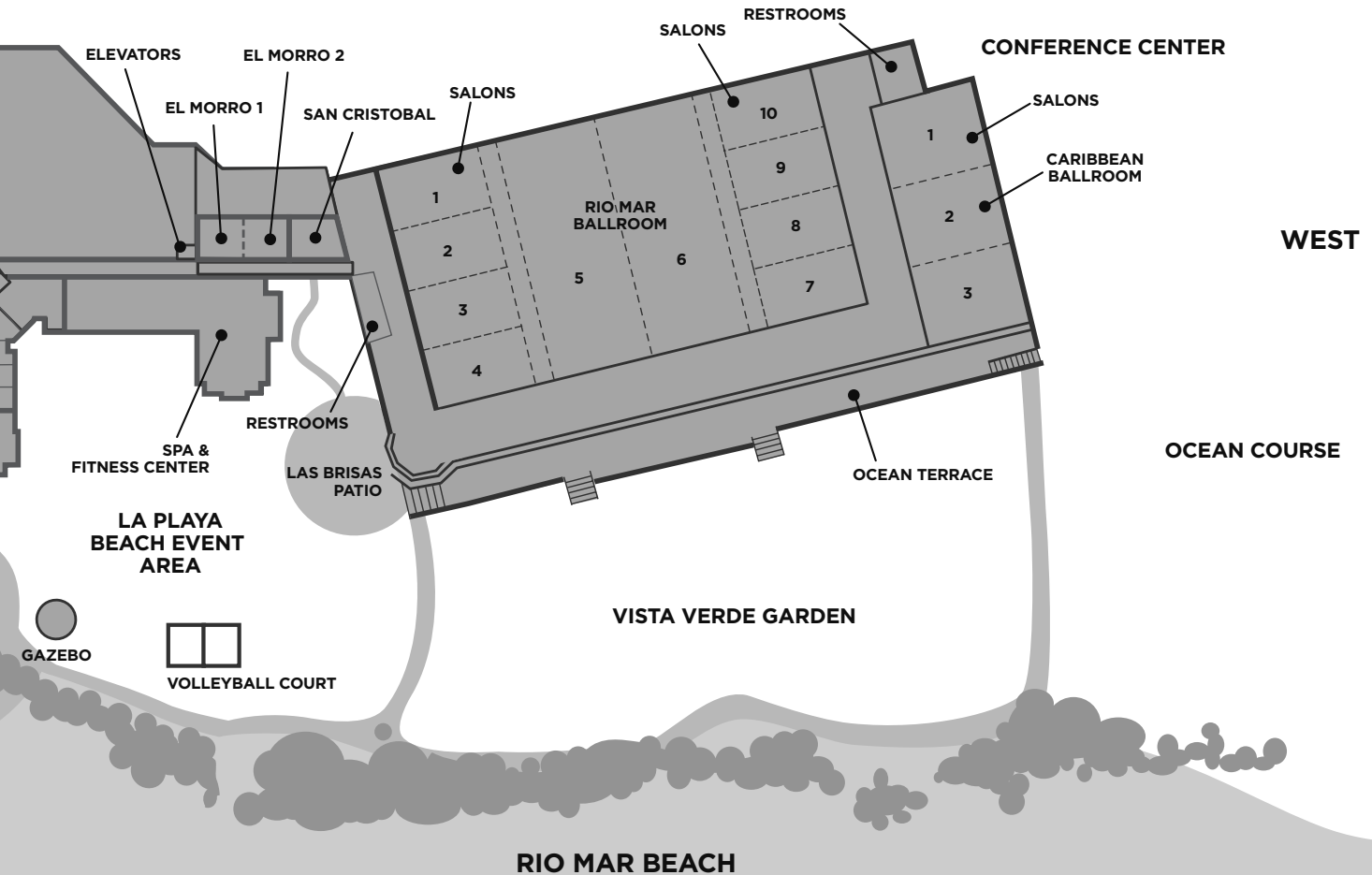
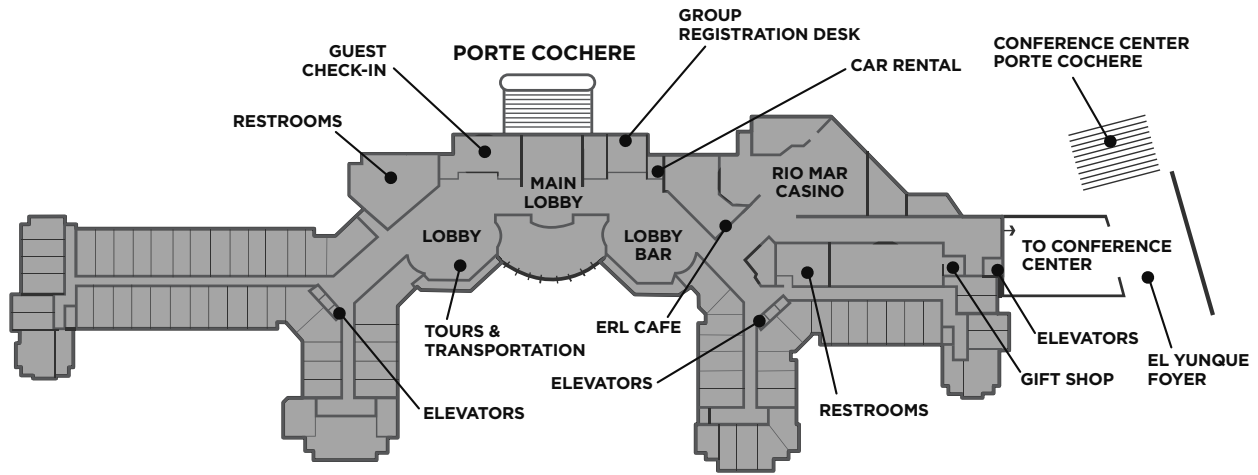


LEVEL 1



AERIAL VIEW

LEVEL 3



General Information

Information about NARST

The National Association for Research in Science Teaching was founded in 1928 for the purpose of promoting research in science education at all educational levels and disseminating the findings of this research in such ways as to improve science teaching and learning. 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*. 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 worldwide organization for improving science teaching and learning 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 worldwide 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. To learn more about NARST you may visit the Association's website at <http://narst.org/> and read the Bylaws approved by the membership in October 2008 at http://www.narst.org/about/NARST_bylaws.pdf.

Member Benefits

- Ten issues of the *Journal of Research in Science Teaching* (JRST) are published each volume year. JRST has been ranked as one of the highest quality educational journals according to studies published by War, Holland and Schramm (American Educational Research Journal) and Guba and Clark (Educational Researcher) for the American Educational Research Association (AERA). These authors identified JRST as clearly the top research journal in science education.
- The NARST Annual International Conference CD is distributed at the Annual International Conference. CD includes a compiled list of abstracts (on CD-ROM) for the current Annual International Conference, plus copies of accepted papers submitted voluntarily by authors prior to the conference. Members attending the conference receive a copy on-site and the cost is included in their registration fee.
- Members have access to E-NARST News, which is published twice a year and available on the NARST website.
- Website and Listserv, allowing access to further information about the Association. You may access this site at the following URL: <http://www.narst.org>. There is further information about subscribing to the listserv on this site.

Explanation of Program Session Formats

Paper Sessions Organized by the Program Committee

In a paper session, the presider introduces the presenters and monitors the time used for each presentation. All papers will be allotted 15 minutes for presentation, followed by approximately 5 minutes of questions or discussion. The presider and audience will use any time remaining in the session for additional discussion, general review, and suggestions for further research. Each presenter is expected to disseminate a paper during or immediately following the session, unless the paper is on the NARST 2013 CD, distributed as part of the program.

Symposium

A symposium involves a panel of experts or stakeholders who examines a specific theme or issue. This format does not involve the presentation of individual papers. Therefore, individual papers and authors will not be listed under this format. Rather, the participants are listed as panel members. The proposer controls presentations, discussion, and questioning with the assistance of the presider or discussant (if designated). Discussion should promote the expression of similar or alternative viewpoints and theoretical positions. The proposer of the symposium is expected to disseminate a paper or a summary with references during or immediately following the session, unless a summary of the symposium is on the NARST 2013 CD.

Related Paper Set

This category accommodates, in a single session, three to five related research papers reporting several studies that originate from a common base of research. This format also allows for common elements of design or approach to be presented once rather than repetitively. The proposer and authors may determine the specifics of the session once it is accepted. For instance, those involved may opt for a formal presentation style or they may conduct their session in a more informal, discussion-oriented style. Each presenter is expected to disseminate a paper during or immediately following the session, unless a summary of the related paper set is on the NARST 2013 CD.

Interactive Poster Sessions

This format offers presenters the opportunity to display their work graphically in a traditional poster session format. Displays should fit on the 48" (long) x 36" (high) tri-fold boards provided and should include a brief abstract in large typescript. Each presenter must set up the display prior to the start of the Poster Session and then remove it promptly at the end of the Poster Session. Each presenter is expected to disseminate a paper during the session, unless a summary of the poster is on the 2013 CD.

Guidelines for Meeting Presenters

- Go to the designated room at least 10 minutes early.
- Greet the presider/discussant.
- NARST provides the LCD and screen in each presentation room. NARST does not provide computers. You must have your own notebook computer or you may put your file on a USB flash drive in advance, in case you will be using another presenter's computer for your presentation.
- Check your understanding of the LCD projector and any other audiovisual equipment prior to the session.
- Keep presentation within the designated time limit.
- Invite audience comments and questions.
- If there is no presider assigned for your session, then presenters should keep time for each other.

Guidelines for Presiders and Discussants

We have accommodated most sessions with a presider, whose role is detailed below. For sessions without presiders, we are counting on the presenters to set aside time for discussion so that the audience participants can contribute to a discussion of the papers.

The role of the Presider includes:

- Arrive early at designated room and arrange furniture as per desires of presenters.
- Check and focus LCD projector.
- Check pronunciations of the names of the presenter and their institutions.
- With presenters, make a time plan, retaining the order of presenters in the program.
- Start session promptly.
- Introduce presenters and serve as timekeeper. Alert presenters when they have 5, 3, and 1 minute remaining. It is important to end each presentation within the agreed allocated time to ensure fairness to all presenters and in order to end the session on time. One suggestion that may be followed is if someone begins to exceed their allotted time, then it is appropriate to stand up and politely announce to the audience that you invite further discussion directly with the author(s) at the conclusion of the entire session.
- Facilitate discussion, assuring equitable involvement of audience members. Close session on time.

The role of the Discussant includes:

- Read papers before the session and have remarks prepared ahead of time.
- Perform presider duties as detailed above, if there is only a discussant for the session.
- After the presentation, make brief and cogent remarks on each paper with suggestions for future research.

Strand Key

STRAND 1 – Science Learning: Understanding and Conceptual Change
STRAND 2 – Science Learning: Contexts, Characteristics, and Interactions
STRAND 3 – Science Teaching-Primary School (Grades preK-6): Characteristics and Strategies
STRAND 4 – Science Teaching-Middle and High School (Grades 5-12): Characteristics and Strategies
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 – Reflective Practice
STRAND 10 – Curriculum, Evaluation, and Assessment
STRAND 11 – Cultural, Social, and Gender Issues
STRAND 12 – Educational Technology
STRAND 13 – History, Philosophy, and Sociology of Science
STRAND 14 – Environmental Education
STRAND 15 – Policy

A Special Thanks to our Sponsors and Exhibitors

TBD

We acknowledge Wiley-Blackwell and their work as publisher of the *Journal of Research in Science Teaching* – JRST

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2014 NARST Annual International Conference

The Program Chair invites NARST members and others to participate in the 2014 NARST Annual International Conference, and start planning next year's program proposals during the 2013 conference.

VENUE:

NARST 2014 Annual International Conference

The Wyndham Grand Pittsburgh Downtown, Pittsburgh, PA, USA

March 30 – April 2, 2014

THEME:

Awakening Dialogues: Advancing Science Education Research, Practices and Policies

What are the most salient issues that the global science education research community should be addressing over the next few decades? What are the “elephants in the room”—those longstanding issues we know exist, but have yet to openly discuss? The 2014 conference theme, “Awakening Dialogues,” is oriented toward these challenging issues, while encouraging you to engage in dialogues that promote opportunities for thinking critically, understanding perspectives, and reframing practices. “Awakening Dialogues” means exposing and making explicit the assumptions, attitudes, beliefs, and practices that impose limitations in our field. Engaging in such dialogues ought to sharpen understandings, frame new inquiries and reframe existing ones—moving science education to the next generation of research, practices, and policies. To paraphrase the late John W. Gardner, let the “great opportunities brilliantly disguised as insoluble problems” in science education inspire your proposals for the 2014 NARST Annual International Conference. You are encouraged to link your proposal to ways in which your ideas contribute to new dialogues within our science education community.

SUBMISSION DEADLINE: The Program Chair or designate must receive your program proposals for the 2014 Annual International Conference by August 15, 2013. The deadline allows sufficient time for processing, reviewing and evaluating the many proposals. In June 2013, the call for program proposals will appear on the NARST website.

Conference Chair: Lynn A. Bryan, President-Elect

Future Meeting Dates for NARST, NSTA, and AERA

2013

NSTA San Antonio, TX, April 11 - 14

AERA San Francisco, CA April 27 – May 1

2014

NARST Pittsburgh, PA, March 30 - April 2

NSTA Boston, MA, April 3 - 6

AERA Philadelphia, PA, April 3 - 7

2012-13 Strand Coordinators

Strand 1: Science Learning, Understanding, and Conceptual Change

Michelle Cook, Shulamit Kapon

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Amy Taylor, Leah Bricker

Strand 3: Science Teaching—Primary School (Grades preK-6)

Nicole Glen, Deborah Smith

Strand 4: Science Teaching—Middle and High School (Grades 5-12)

Sara Salloum, Hayat Hokayem

Strand 5: College Science Teaching and Learning (Grades 13-20)

Sanghee Choi, April Nelms

Strand 6: Science Learning in Informal Contexts

Heather Toomey Zimmerman, David Kanter

Strand 7: Pre-service Science Teacher Education

Jacqueline McDonnough, Asli Sezen

Strand 8: In-service Science Teacher Education

Danielle Dani, Heba EL-Deghaidy

Strand 9: Reflective Practice

Kim Charmatz, Femi Otulaja

Strand 10: Curriculum, Evaluation, and Assessment

Gavin Fulmer, Cari Herrmann Abell

Strand 11: Cultural, Social, and Gender Issues

Shawn Holmes, Anna Lewis

Strand 12: Educational Technology

Len Annetta, Kent Crippen

Strand 13: History, Philosophy and Sociology of Science

Catherine Koehler, Valarie Akerson

Strand 14: Environmental Education

Jennifer Adams, Erica Blatt

Strand 15: Policy

Andy Shouse, Erin Peters-Burton, Todd Hutner

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NARST Award Winners

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, have 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	Year	Awardee	Year	Awardee
1986	Anton E. Lawson	1997	Rosalind Driver	2007	Kenneth Tobin
1987	Paul DeHart Hurd	1998	James J. Gallagher	2008	Dorothy Gabel
1988	John W. Renner	1999	Peter J. Fensham	2009	Peter W. Hewson
1989	Willard Jacobson	2000	Jane Butler Kahle		Léonie Jean Rennie
1990	Joseph D. Novak	2001	John K. Gilbert		Wolff-Michael Roth
1991	Robert L. Shrigley	2002	Audrey B. Champagne	2010	Reinders Duit
1992	Pinchas Tamir	2003	Barry J. Fraser		Joseph Krajcik
1993	Jack Easley, Jr.	2004	Robert E. Yager	2011	Norman Lederman
1994	Marcia C. Linn		Paul Black	2012	Charles W. (Andy) Anderson
1995	Wayne W. Welch	2005	John C. Clement		Larry Yore
1996	Carl F. Berger	2006	David Treagust	2013	Dale R. Baker

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

The JRST Award is given annually to the author or authors of the *Journal of Research in Science Teaching* article that is judged the most significant publication for that year.

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

The NARST Outstanding Paper Award

The NARST Outstanding Paper Award is given annually for the paper or research report presented at the NARST Annual International Conference that is judged to have the greatest significance and potential in the field of science education.

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

Outstanding Doctoral Research Award

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	Major Professor
1992	René 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 and 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 Zimmerman	Phillip Bell
2011	Jeffrey J. Rozelle	Suzanne M. Wilson
2011	Catherine Eberbach	Kevin Crowley
2012	Melissa Braaten	Mark Windschitl
2013	Lori Fulton	Jian Wang

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	Year	Awardee	Year	Awardee
1993	Wolff-Michael Roth	2000	Angela Calabrese Barton	2007	Bryan A. Brown
1994	Deborah J. Tippins	2001	Julie A. Bianchini	2008	Hsin-Kai Wu
1995	Nancy B. Songer	2002	Alan G. Harrison	2009	Troy D. Sadler
1996	Mary B. Nakhleh	2003	Fouad Abd-El-Khalick	2010	Thomas Tretter
1997	Peter C. Taylor	2004	Grady J. Venville	2011	Katherine L. McNeill
1998	J. Randy McGinnis	2005	Randy L. Bell	2012	Victor Sampson
1999	Craig W. Bowen	2006	Heidi Carlone	2013	Alandeom W. Oliveira
	Gregory J. Kelly				

Outstanding Master's 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
1995	Moreen K. Travis	Carol L. Stuessy
1996	Lawrence T. Escalada	Dean A. Zollman
1997	C. Theresa Forsythe	Jeffrey W. Bloom
1998	Reneé D. Boyce	Glenn Clark
1999	Andrew B. T. 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	Livingston S. Schneider and John W. Renner (Five Equal Awards) Heidi Kass and Allan Griffiths Ramona Saunders and Russell H. Yeany Joe Long, James R. Okey, and Russell H. Yeany M. James Kozlow and Arthur L. White
1981	Dorothy L. Gabel, Robert D. Sherwood, and Larry G. Enochs (Four Equal Awards) Wayne Welch, Ronald D. Anderson, and Harold Pratt Mary Ellen Quinn and Carolyn Kessler P. Ann Miller and Russell H. Yeany
1982	Louise L. Gann and Seymour Fowler (Four Equal Awards) Dorothy L. Gabel and Robert D. Sherwood Thomas L. Russell Joseph C. Cotham
1983	Robert D. Sherwood, Larry G. Enochs, and Dorothy L. Gabel
1984	Mary Westerback, Clemencia Gonzales, and Louis H. Primavera (Four Equal Awards) Kenneth G. Tobin Hanna J. Arzi, Ruth Ben-Zvi, and Uri Ganiel Charles Porter and Russell H. Yeany
1985	Dan L. McKenzie and Michael J. Padilla (Three Equal Awards) Margaret Walkosz and Russell H. Yeany Kevin C. Wise and James R. Okey
1986	Sarath Chandran, David F. Treagust, and Kenneth G. Tobin (Four Equal Awards) Darrell L. Fisher and Barry J. Fraser Dorothy L. Gabel, Stanley L. Helgeson, Joseph D. Novak, John Butzow, and V. K. Samuel Linda Cronin, Meghan Tweist, and Michael J. Padilla
1987	Dorothy L. Gabel, V. K. Samuel, Stanley L. Helgeson, Sandra McGuire, Joseph D. Novak, and John Butzow
1988	Uri Zoller and Benn Chaim
1989	James D. Ellis and Paul J. Kuerbis
1990	Dale R. Baker, Michael D. Piburn, and Dale S. Niederhauser
1991	David F. Jackson, Billie Jean Edwards, and Carl F. Berger

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(14) Shulamit Kapon	Tel Aviv University	shulamit.kapon@gmail.com

Strand 2: Science Learning: Contexts, Characteristics and Interactions

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Strand 3: Science Teaching—Primary School (Grades preK-6)

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Strand 4: Science Teaching—Middle and High School (Grades 5-12)

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Strand 6: Science Learning in Informal Contexts

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Strand 7: Pre-service Science Teacher Education

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Strand 8: In-service Science Teacher Education

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Strand 9: Reflective Practice

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Awards Committee

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NARST Outstanding Paper Award Selection Committee

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Outstanding Doctoral Research Award Selection Committee

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Ex-Officio:

NOTE: NO GRAD students on this committee

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KEY:

*Graduate Student

Are you a **TEACHER EDUCATOR** in search of authoritative, engaging online classroom resources in biology, chemistry, and environmental health? Or a **SCIENCE EDUCATION RESEARCHER** looking for resources that can be used to support socioscientific learning about environmental health?

Web sites and curriculum materials from the National Library of Medicine (NLM) provide reliable standards-based resources that can support problem-based, collaborative science learning activities, connect science to other disciplines, and lead to social action projects.



SELECTED CLASSROOM RESOURCES FROM NLM

BIOLOGY

MedlinePlus® (Grades 6–12+)

Easy to read health information. An excellent source for all ages. Also available in Spanish.

medlineplus.gov

PubMed®/MEDLINE® (Grades 11–12+)

A citation index for articles from medical and life science journals. View the PubMed tutorial for site navigation.

pubmed.gov

CHEMISTRY

ChemIDplus®/Chemicals Page (Grades 7–12+)

View and manipulate chemical structures for more than 388,000 chemicals. Create cis and trans models, conduct structure similarity searches, and view chemical synonyms.

sis.nlm.nih.gov/chemical.html

ENVIRONMENTAL HEALTH SCIENCE

Environmental Health Student Portal (Grades 6–8)

Portal that connects middle school students to environmental health information.

kidsenvirohealth.nlm.nih.gov

Tox Town® (Grades 6–12+)

Guide to commonly encountered toxic substances. Includes classroom materials. Also available in Spanish.

toxtown.nlm.nih.gov

Tox Town® Environmental Health Curriculum for Middle School (Grades 6–8)

Lessons and activities combine research on the Tox Town® Web site with hands-on experiments and social action activities.

toxtown.nlm.nih.gov/text_version/teachers6.php

GENETICS

GeneEd (Grades 9–12+)

Links to vetted genetic Web sites based on high school science curriculum. Includes lesson plans and current events.

geneed.nlm.nih.gov

Genetics Home Reference™ (Grades 6–12+)

Information about genetic conditions.

ghr.nlm.nih.gov

For additional educational resources, visit the NLM K-12 page: **k12.nlm.nih.gov**.

Questions? Contact Dr. Alla Keselman at **keselmana@mail.nih.gov**.



NARST Annual International Conference

Schedule at a Glance - 2013

Wyndham Río Mar
Río Grande, Puerto Rico

Date/Time	Event	Room
Friday, April 5		
7:30 AM – 5:00 PM	NARST Executive Board Meeting #1	Caribbean Salon 3
2:00 PM - 5:00 PM	Registration	Río Mar Atrium
Saturday, April 6		
7:30 AM – 12:00 PM	NARST Executive Board Meeting #2	Caribbean Salon 3
7:00 AM – 5:00 PM	Registration	Río Mar Atrium
Please note: You must register for the Pre-conference Excursion or Workshops with your Advance Conference Registration.		
7:30 AM - 12:00 PM	Pre-conference Excursion: Program Committee	Bus Departs from Main Entry to Río Mar
	Journey to El Yunque: Excursion to Luquillo Long-Term Ecological Research Field Station	
8:00 AM – 12:00 PM	Pre-Conference Workshop #1: Equity and Ethics Committee	Río Mar Salon 2
	The S in STEM Education: Focusing on Social Justice Issues in Science Education	
8:00 AM – 12:00 PM	Pre-Conference Workshop #2: Publications Committee	El Morro 1 and 2
	Developing High Quality Reviews for the <i>Journal of Research in Science Teaching</i>	
8:00 AM – 12:00 PM	Pre-Conference Workshop #3: Research Committee	Río Mar Salon 8
	Developing a Competitive Proposal for Programs in NSF's Division of Research on Learning in Formal and Informal Settings	
8:00 AM – 12:00 PM	Pre-Conference Workshop #4: Research Committee	Río Mar Salon 4
	Exploration of a New "Words-to-Images" Tool for Analyzing Videos of Science Teaching	
12:00 PM – 1:00 PM	Lunch	On your own
1:00 PM – 2:30 PM	Concurrent Session # 1	
2:45 PM – 4:00 PM	Concurrent Session # 2	
4:00 PM – 4:30 PM	Break	
4:30 PM – 5:50 PM	Plenary Session # 1	Río Mar Ballroom 5 and 6
	Speaker - Margaret Honey, New York Hall of Science, NYC Design, Make, Play: Growing the Next Generation of STEM Innovators	
6:00 PM – 7:00 PM	Mentor-Mentee Nexus	Río Mar Salon 2
6:00 PM - 7:00 PM	Research Interest Groups (RIGs) Meetings:	
	The Continental and Diasporic Africa in Science Education	Río Mar Salon 3
	Engineering Education	Río Mar Salon 7
	Latino/a RIG (LARIG)	Río Mar Salon 9
7:00 PM – 9:30 PM	Presidential / Welcome Reception (Appetizers served and cash bar)	Vista Verde Garden

Sunday, April 7

7:00 AM – 8:15 AM	Committee Meetings	
7:00 AM – 5:00 PM	Registration	Río Mar Atrium
8:30 AM – 10:00 AM	Concurrent Session # 3	
10:15 AM – 11:45 AM	Concurrent Session # 4	
12:00 – 1:00 PM	NARST Business Meeting (Box lunch provided for 1st 100 attendees who sign up)	Caribbean Salon 3
12:00 - 1:00 PM	Lunch	On your own
1:15 PM – 2:45 PM	Concurrent Session # 5	
2:45 PM - 3:15 PM	Break	
3:15 PM - 4:15 PM	Concurrent Session # 6A: Poster Session	Río Mar Ballroom 5
4:15 PM - 5:15 PM	Concurrent Session # 6B: Poster Session	Río Mar Ballroom 6
5:30 PM – 7:00 PM	Graduate Student Forum	Río Mar Salon 2
6:00 PM – 8:00 PM	Springer Reception (By invitation only)	Caribbean Salon 3
7:00 PM - 8:00 PM	Graduate Student and Early Career Scholars Social (Informal social - on your own)	Poolside

Monday, April 8

7:00 AM – 8:15 AM	Committee Meetings	
7:00 AM – 5:00 PM	Registration	Río Mar Atrium
8:30 AM – 10:00 AM	Concurrent Session # 7	
10:00 AM - 10:30 AM	Break	
10:30 AM – 11:50 AM	Plenary Session #2: William F. Tate IV, Washington University in St. Louis Research on Ecological Context and Place: Investigating the Landscape of STEM Opportunities	Río Mar Ballroom 5 and 6
12:00 PM – 2:00 PM	Awards Luncheon	Vista Verde Garden
2:15 PM – 3:45 PM	Concurrent Session # 8	
4:00 PM - 5:30 PM	Concurrent Session # 9	
5:45 PM – 6:45 PM	New Researcher and Junior Faculty Early Career Discussion	Caribbean Salon 1
6:00 PM – 7:30 PM	JRST Editorial Board Meeting	Caribbean Salon 3
7:30 PM – 10:00 PM	JRST at 50: A Tropical Silver Celebration Desserts, Cash bar, Entertainment	Vista Verde Garden

Tuesday, April 9

7:00 AM – 8:15 AM	Strand Meetings	
7:00 AM – 12:00 PM	Registration	Río Mar Atrium
8:30 AM – 10:00 AM	Concurrent Session # 10	
10:15 AM - 11:45 AM	Concurrent Session # 11	
12:00 PM – 1:00 PM	Lunch	On your own
1:00 PM – 2:30 PM	Concurrent Session # 12	
2:45 PM - 4:15 PM	Concurrent Session # 13	
4:45 PM – 10:00 PM	Equity Dinner Group transportation departs hotel at 4:45; returns after dinner Barrachina Restaurant, San Juan Please note: You must register for this event with your Advance Conference Registration.	Off-site

Wednesday, April 10

7:30 AM - 11:00 AM	NARST Executive Board Meeting #3	Caribbean Salon 3
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PROGRAM

Friday, April 5, 2013

NARST Executive Board Meeting Session #1
7:30am – 5:00pm, Caribbean Salon 3

Conference Registration
2:00pm – 5:00pm, Rio Mar Atrium

Saturday, April 6, 2013

Conference Registration

7:00am – 5:00pm, Río Mar Atrium

NARST Executive Board Meeting Session #2

7:30am – 12:00pm, Caribbean Salon 3

Pre-Conference Excursion**7:30am – 12:00pm**

Pre-Conference Excursion – Program Committee Sponsored (\$50 Registration Fee – MUST be paid for in advance with registration. Maximum 39 participants.)

Journey to El Yunque

7:30am – 12:00pm, Excursion to Luquillo Long-Term Ecological Research Field Station. Bus departs from Main Entry of Río Mar to El Yunque.

Presenters:

Steven McGee, The Learning Partnership
 Jess Zimmerman, University of Puerto Rico
 Noelia Báez Rodríguez, University of Puerto Rico
 Omar Perez-Reyes, University of Puerto Rico
 Pauline Chinn, University of Hawai'i at Manoa
 Rojjana Klechaya, Institute for the Promotion of Teaching Science and Technology in Thailand

Pre-Conference Workshops**8:00am – 12:00pm****Pre-Conference Workshop—Equity and Ethics Committee Sponsored (Free)**

The S in STEM Education: Focusing on Social Justice Issues in Science Education

8:00am – 12:00pm, Río Mar Salon 2**Organizers:**

Felicia Moore Mensah, Teachers College, Columbia University
 Joi Merritt, Michigan State University
 Matthew Weinstein, UW Tacoma
 Deborah Roberts-Harris, University of New Mexico
 Irene Osioma, California State University
 Jacqueline Samuel, University of Southern Mississippi

Presider:

Regina Wragg, University of South Carolina
 Blakely Tsurusaki, University of Washington
 Leon Walls, University of Vermont
 Gillian Bayne, Lehman College
 Mary M. Atwater, University of Georgia
 Sumi Hagiwara, Montclair State University
 Deborah Morrison, University of Colorado at Boulder
 Alicia Trotman, Mercy College
 Alejandro J. Gallard, Georgia Southern University

Pre-Conference Workshop—Publications Committee Sponsored (Free)

Developing High Quality Reviews for the *Journal of Research in Science Teaching*

8:00am – 12:00pm, El Morro 1 and 2

Angela M. Calabrese-Barton, Michigan State University

Joseph S. Krajcik, Michigan State University

JRST Associate Editors

Pre-Conference Workshop—Research Committee Sponsored (Free)

Developing a Competitive Proposal for Programs in NSF's Division of Research on Learning in Formal and Informal Settings

8:00am – 12:00pm, Río Mar Salon 8

Ellen McCallie, NSF

Sandra Toro, NSF

Elizabeth VanderPutten, NSF

Julio Lopez, NSF

Janet Kolodner, NSF

Pre-Conference Workshop—Research Committee Sponsored (Free)

Exploration of a New “Words-to-Images” Tool for Analyzing Videos of Science Teaching

8:00am – 12:00pm, Río Mar Salon 4

Kathleen Roth, BSCS

April Gardner, BSCS

Molly Stuhlsatz, BSCS

Lunch—On Your Own**12:00pm – 1:00pm****Concurrent Session #1****1:00pm – 2:30pm****Research Committee Sponsored Session**

New Directions for Education Research and Development in the National Science Foundation's (NSF's) Directorate for Education and Human Resources (EHR)

1:00pm – 2:30pm, Caribbean Salon 1**Discussants:**

Brian J. Reiser, Northwestern University

Leona Schauble, Vanderbilt University

Presenters:Joan Ferrini-Mundy, National Science Foundation, jferrini@nsf.gov

Richard Duschl, National Science Foundation

Janice Earle, National Science Foundation

Strand 1: Science Learning, Understanding and Conceptual Change

Related Paper Set - Relating Learning Progressions to Student Inquiry and Explanation Practices in Teaching for Environmental Science Literacy

1:00pm – 2:30pm, Río Mar Salon 1

Alternative Learning Trajectories toward Understanding Matter and Energy in Socio-ecological Systems

Hannah K. Miller, Michigan State University, hkm@msu.edu
Jenny M. Dauer, Michigan State University
Charles W. Anderson, Michigan State University

Inquiry Learning Progression Framework for Carbon Transforming Processes

Jenny M. Dauer, Michigan State University, dauerjen@msu.edu
Hannah K. Miller, Michigan State University
Charles W. Anderson, Michigan State University

Designing Learning Progression Assessments that Assess Principles First

Kathryn Oleszkowicz, Michigan State University, oleszko4@msu.edu
Jennifer H. Doherty, Michigan State University
Charles W. Anderson, Michigan State University

Teachers' Implementation of Curriculum Units and Student Learning in Carbon-transforming Processes

Jiwon Kim, Michigan State University, kimjiwo1@msu.edu
Li Zhan, Michigan State University
Charles W. Anderson, Michigan State University

Using Scenario-based Assessments to Build a Learning Progression Framework for Reasoning about Ecosystems

Jennifer H. Doherty, Michigan State University, dohert59@msu.edu
Laurel M. Hartley, University of Colorado-Denver

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Science Learning and Issues Related to Motivation, Self-Efficacy, and Epistemology

1:00pm – 2:30pm, Río Mar Salon 10

President:

Andrea R. Milner, Adrian College

Beyond Cartesian Dualism: How does Emotion Influence Science Learning?

Nancy L. Staus, Oregon State University, stausn@onid.orst.edu

Understanding Practical Epistemologies as Ideas or as Action: What are the Consequences for Science Education?

Per-Olof Wickman, Stockholm University,
per-olof.wickman@mnd.su.se

Science Self-Efficacy and School Transitions: Elementary to Middle School and Middle School to High School

Brandi Lofgran, Brigham Young University, brandilofgran@gmail.com
Leigh K. Smith, Brigham Young University

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Science Learning within Biology Domains

1:00pm – 2:30pm, Caribbean Salon 2

President:

Leslie Keiler

Socioscientific Issues as an Instructional Tool for Promoting Students' Communication Skills in the Science Classroom

Yoonsook Chung, Ewha Womans University, venuself@naver.com
Jungsook Yoo, Ewha Womans University
Hyunju Lee, Ewha Womans University

Coauthoring the Curriculum: Testing a Strategy for Incorporating Students' Interests into the High-School Biology Classroom

Galit Hagay, Technion - Israel Institute of Technology,
hagayga@012.net.il
Ayelet Baram-Tsabari, Technion

Examining the Interaction between Content and Context: An Empirical Analysis of Genetics News Articles

Nicole A. Shea, Rutgers University, nlefur@eden.rutgers.edu
Ravit G. Duncan, Rutgers University
Lauren Giannetti, Rutgers University

Science Teacher Authentic Classroom Instruction and Student Neuroscience Learning

Mary Hoelscher, University of Minnesota, hoel0039@umn.edu
Charlene Ellingson, University of Minnesota
Rachelle A. Haroldson, Science Museum of Minnesota
Selcen Guzey, University of Minnesota
Gillian Roehrig, University of Minnesota

Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies

Dilemmas and Understandings in Elementary Science

1:00pm – 2:30pm, Río Mar Salon 3

Presider:

Huseyin Colak

Astronomy in Preschool? Using Play-based Science Instruction to Teach Space Science Concepts to Preschool Children

Heather L. Miller, The Ohio State University, miller.5589@osu.edu

Mandy M. Smith, The Ohio State University

Kathy C. Trundle, The Ohio State University

Mesut Sackes, Balikesir University

Katherine N. Mollohan, The Ohio State University

Children's Conceptual Knowledge of Plant Structure and Function

Janice L. Anderson, University of North Carolina at Chapel Hill,

anderjl@email.unc.edu

Preservice Elementary Science Teachers' Reflections on Teaching Extended Inquiry Investigations

Arzu Tanis Ozcelik, Pennsylvania State University, axt252@psu.edu

Julia Plummer, Pennsylvania State University

A Comparative Study of Early Learners' Engagement in Scientific Practices in the U.S. and Germany

Cory T. Forbes, University of Iowa, cory-forbes@uiowa.edu

Kim Lange, University of Augsburg

Kornelia Möller, University of Münster

Mandy Biggers, University Of Iowa

Mira Laux, University of Münster

Laura Zangori, University Of Iowa

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies

Teaching Practices and Student Achievement

1:00pm – 2:30pm, Pelican Room

Presider:

Deborah C. Peek-Brown

An Efficacy Trial of Research-Based Instructional Materials with Curriculum-Based Professional Development

Susan M. Kowalski, BSCS, skowalski@bscs.org

Joseph A. Taylor, BSCS

Stephen Getty, BSCS

Christopher Wilson, BSCS

Janet Carlson, BSCS

Evaluation of Project-based Science Learning/ Teaching with Digital Backpacks: The CincySTEM Initiative

Gulbahar Beckett, University of Cincinnati, gulbahar.beckett@uc.edu

Annette Hemmings, Edgewood College

Relationship between Different Science Teaching Strategies and Science Achievement

Su Gao, University of Nevada, Las Vegas, gaos2@unlv.nevada.edu

Zhiyong Zhong, Minzu University of China

Jian Wang, University of Nevada, Las Vegas

Using Simulations vs. Overheads: A Comparative Case Study of Questioning Strategies in Three Science Teachers

Norman T. Price, University of Massachusetts /

SRRI, normprice@gmail.com

John J. Clement, University of Massachusetts

A Different Common Core: An Expert Delphi Study on Core Science Teaching Practices

Matthew Kloser, University of Notre Dame, mkloser@nd.edu

Strand 5: College Science Teaching and Learning (Grades 13-20)

Courses or Programs Facilitating Science Practices

1:00pm – 2:30pm, San Cristobal

Presider:

Nancy Moreno

Modifying Postsecondary Laboratory Courses to More Accurately Reflect NOS, Confront Misconceptions, and Retain STEM Majors

Lori M. Ihrig, Iowa State University, lihrig@iastate.edu

Michael C. Slade, Iowa State University

Michael P. Clough, Iowa State University

Craig A. Ogilvie, Iowa State University

The Impact of an REU and RET Program on Participants' Scientific Research Skills

Allan Feldman, University of South Florida, afeldman@usf.edu

Dilek Ozalp, University of South Florida

Fayez Alshehri, University of South Florida

Angela Chapman, University of South Florida

Vanessa Vernaza-Hernandez, University of South Florida

Strand 5: College Science Teaching and Learning (Grades 13-20)

Assessing College Science Teaching

1:00pm – 2:30pm, Parrot Room

Presider:

Sanghee Choi, University of North Georgia

Assessing Assessment: How Use of a Concept Inventory Influences Instructional Practices of a Biology Professor

Binaben H. Vanmali, Arizona State University, bina.vanmali@gmail.com

Marcelle Siegel, University Of Missouri-Columbia

Assessing Undergraduates' Modeling Skills: A Study of Explanatory Model Construction in Chemistry

Gregory Pennington, Western Washington University,

penning@students.wvu.edu

Emily Borda, Western Washington University

From Their Point of View: Assessing Undergraduate Educational Practices Using Point-of-View Cameras

Joseph A. Harsh, Indiana University, jharsh@indiana.edu

Adam V. Maltese, Indiana University

Joshua Danish, Indiana University

Strand 6: Science Learning in Informal Contexts

Learning About the Natural Environment Outside of School

1:00pm – 2:30pm, Sea Gull Room

Presider:

Catherine Eberbach

Students' Changing Mental Models of the Longleaf Pine Ecosystem

Alejandro J. Gallard, Georgia Southern University,

agallard@georgiasouthern.edu

Michael Dentzau, Florida State University

Girls Energy Conservation Corps: Study of a Girl Scout Program Focused on Energy Conservation

Gillian Puttick, TERC, gilly_puttick@terc.edu

Debra Bernstein, TERC

Polly Hubbard, TERC

Science Outdoors and In: Elementary Students' Science Knowledge, Environmental Attitudes, and Outdoor Comfort Levels

Sarah J. Carrier, North Carolina State University,

sarah_carrier@ncsu.edu

Margareta M. Thomson, North Carolina State University

Linda P. Tugurian, North Carolina State University

Strand 7: Pre-service Science Teacher Education

Symposium - Science Teacher Educators as Multiculturalists and Equity and Social Justice Agents

1:00pm – 2:30pm, Canary Room

Presider:

Melody Russell, Auburn University

Discussant:

Malcolm B. Butler, University of Central Florida,

Malcolm.Butler@ucf.edu

Presenters:

Mary M. Atwater, University of Georgia, atwater@uga.edu

Natasha Johnson, University of Georgia

Neporcha Cone, Kennesaw State University

Obed Norman, Howard University

Celestine H. Pea, National Science Foundation

Sheneka Williams, University of Georgia

Strand 8: In-service Science Teacher Education

Related Paper Set - Promoting Effective Science Teaching through Engineering and Engineering Design

1:00pm – 2:30pm, Río Mar Salon 4

Presider:

Chell Nyquist, Purdue University

Teaching and Learning about Engineering Design: Insights from Elementary Science Teachers and their Professional Development in Engineering Design

Brenda M. Capobianco, Purdue University, bcapo@purdue.edu

James D. Lehman, Purdue University

Chell Nyquist, Purdue University

Supporting Teachers Adopting an Engineering-Based, PBL Middle School Science Curriculum

Sabrina Grossman, Georgia Institute of Technology/CEISMC,

sabrina.grossman@ceismc.gatech.edu

Mike Ryan, Georgia Institute of Technology/CEISMC,

Brian Gane, Georgia Institute of Technology/CEISMC

Marion Usselman, Georgia Institute of Technology/CEISMC

The Relationship between Teacher Self-Efficacy and Student Engineering Identity: An HLM Model

Kerrie Anna Douglas, Purdue University, douglask@purdue.edu

Heidi Diefes-Dux, Purdue University

A Collaborative Approach to Elementary STEM Inservice Professional Development

Carolyn Parker, John Hopkins University, Carolyn.Parker@jhu.edu

Strand 9: Reflective Practice

Teacher as Researcher / Self Study

1:00pm – 2:30pm, Heron Room

President:

Line A. Saint-Hilaire

Pre-service Teacher-as-Researcher: Pre-service Elementary Teachers' Perceptions about Teacher-Researchers

Youngjin Song, University Of Northern Colorado, young1206@gmail.com

Timothy Pearson, University of Wyoming

Teresa M. Higgins, University of Northern Colorado

Looking at the Mirror: A Self-Study of Prospective Science Teacher Educators' PCK for Teaching Teachers

Sevgi AYDIN, Yuzuncu Yil University, sevgi.aydin45@hotmail.com

Betul Demirdogen, Middle East Technical University

Aysegul Tarkin, Yuzuncu Yil University

Learning from One's Own Teaching: New Teachers Analyzing their Practice through Video Recorded Observation Cycles

Jennifer A. McNally, Curry College, jen.ceven.mcnally@gmail.com

Navigating the Challenges of Teaching Responsively: An Insider's Perspective

April C. Maskiewicz, Point Loma Nazarene University, aprilmaskiewicz@pointloma.edu

Strand 10: Curriculum, Evaluation, and Assessment

Applying Item Response Theory Models to Assessment Development and Validation in Science Education

1:00pm – 2:30pm, Rio Mar Salon 2

President:

Hendrik Haertig

Developing Affective Measures in Science Education with the Rasch Model

Toni A. Sondergeld, Bowling Green State University, tsonder@bgsu.edu

Carla C. Johnson, University of Cincinnati

Janet Walton, University of Cincinnati

Using Rasch Measurement to Validate the Instrument of Students' Understanding of Models in Science (SUMS)

Silin Wei, Hangzhou Normal University, silinwei@163.com

Xiufeng Liu, State University of New York At Buffalo (SUNY)

Jing Wu, Hangzhou Normal University

Do Computer-Generated Written Explanation Scores Closely Approximate Oral Interview Scores? Evidence from Rasch Modeling

Elizabeth P. Beggrow, The Ohio State University, beggrow.7@osu.edu

Minsu Ha, The Ohio State University

Ross H. Nehm, The Ohio State University

William Boone, Miami University

Using Multilevel Multidimensional Item Response Theory to Assess Efficacy of Science Writing Heuristic Teaching Approach

Dai-Trang Le, Iowa State University, daitrangle2@gmail.com

Mack Shelley, Iowa State University

Luke Postvedt, Iowa State University

Joan Baenziger, Iowa State University

Brian M. Hand, University of Iowa

William Therrien, University of Iowa

Strand 11: Cultural, Social, and Gender Issues

Related Paper Set - Promoting Effective Science Teaching for English Learners: Lessons Learned From Classroom Observations

1:00pm – 2:30pm, Rio Mar Salon 8

Integrating Science, Language and Literacy Learning for ELL: Theoretical and Empirical Foundations

Trish Stoddart, University of California - Santa Cruz, stoddart@ucsc.edu

Gauging Pre-Service Teacher Science & Language teaching practices with the Dialogic Activity in Science Inquiry (DAISI) instrument

Marco Bravo, San Francisco State University, mbravo@sfsu.edu

Trish Stoddart, University of California - Santa Cruz

Jorge Solis, University of Texas, San Antonio

Eduardo Mosqueda

What Classroom Observations Can and Can't Tell Us about the Implementation of Science and Language Practices in Middle School Classrooms

Cory A. Buxton, University of Georgia, buxton@uga.edu

Martha Alexsaht-Snyder, University of Georgia

Shakhnoza Kayumova, University of Georgia

Susan Harper, University of Georgia

How Professional Development can Shape Teachers' Pedagogical Delivery of Science and Language Teaching in Middle School Classrooms with English Language Learners (ELLs) and English-Speaking Minority Students

Rafael Lara-Alecio, Texas A & M University, a-lara@tamu.edu

Fuhui Tong, Texas A & M University

Beverly Irby, Sam Houston State University

Cindy Guerrero, Texas A & M University

Strand 11: Cultural, Social, and Gender Issues

Symposium - Inside Personally Relevant Science Learning Contexts: How Do Learners Connect Science to their Everyday Lives?

1:00pm – 2:30pm, El Morro 1 and 2

Presider:

Bryan A. Brown, Stanford University

Discussant:

Angela Calabrese-Barton, Michigan State University

Presenters:

Erika D. Tate, bluknowledge LLC, erika@bluknowledge.com

Tamara Clegg, University of Maryland

Heather T. Zimmerman, Pennsylvania State University

Christina Garnder-McCune, Clemson University

Takumi Sato, Michigan State University

Strand 13: History, Philosophy, and Sociology of Science

Symposium - A Critical Review of HPS Scholarship in Science Education

1:00pm – 2:30pm, Río Mar Salon 9

Presider:

Ron G. Good, LSU (Emeritus)

Discussants:

George E. DeBoer, AAAS Project 2061,

Michael R. Matthews, University of New South Wales

Presenters:

Sibel Erduran, University of Bristol

Mike U. Smith, Mercer University School Of Medicine

Zoubeida R. Dagher, University of Delaware

Jose Chamizo, Facultad De Quimica, UNAM

Olivia Levrini, Department of Physics, University of Bologna

Niklas Gericke, Karlstad University, Sweden

Gregory J. Kelly, Penn State University

Norman Lederman, Illinois Institute of Technology

Strand 14: Environmental Education

Education for Sustainability in Upper Secondary and Post Secondary Education

1:00pm – 2:30pm, Río Mar Salon 7

Presider:

Erica Blatt

Education for Sustainability in a Higher Education Institution: Characteristics and Learning Outcomes

Keren Mintz, Technion, kerenk@technion.ac.il

Tali Tal, Technion

Modeling the Relationships between Recycling Behavior and Gender

Dilek S. Kilic, Hacettepe University, dsultan@hacettepe.edu.tr

Ceren Tekkaya, Middle East Technical University

Gaye Teksoz, Middle East Technical University

Savas Pamuk, Akdeniz University

Elvan Sahin, Middle East Technical University

ESD Oriented Chemistry Education – A Theoretical Model

Kirsti Marie Jegstad, Norwegian University of Life Sciences,

kirsti.jegstad@umb.no

Bottom-up and Top-down Processes for Embedding Education for Sustainability in a College of Education in Israel: A Case Study

Iris Alkaher, Kibbutzim, irisalkaher@gmail.com

Ilana Avisar, Kibbutzim

Concurrent Session #2

2:45pm – 4:00pm

Presidential Sponsored Session

Anticipating NGSS: Building Collaboration and

Infrastructure for Implementation

2:45pm – 4:00pm, Caribbean Salon 1

Presider:

Lynn Bryan, Purdue University

Presenters:

Christopher Lazzaro, The College Board

Martin Storksdieck, National Research Council

Steve Pruitt, Achieve, Inc.

Peter McLaren, Chief State Science Supervisors

Sharon J. Lynch, George Washington University

Strand 1: Science Learning, Understanding and Conceptual Change

Assessing and Dealing with Students' Preconceptions of Evolution

2:45pm – 4:00pm, Río Mar Salon 1

Presider:

Anat Yarden

A First Appraisal to Chilean Teachers and Undergraduate Students' Understandings of the Evolution Theory

Juan P. Jimenez, Illinois Institute of Technology, jjimen10@iit.edu

Hernan Cofre, Illinois Institute of Technology

Claudia Vergara, Illinois Institute of Technology

David Santibañez, Universidad Catolica Cardenal Raul Silva Henriquez

Development and Field Testing of the Middle School Version of Conceptual Inventory of Natural Selection

Dianne L. Anderson, Point Loma Nazarene University,
dianneanderson@pointloma.edu
Patricia L. Evans, Point Loma Nazarene University

Domain-Specific Differences in Students' Argumentation Practices - Students' Arguments about Evolutionary Theory and Genesis Narration

Nicolai Basel, Leibniz Institute (IPN) Kiel, Germany,
basel@ipn.uni-kiel.de
Ute Harms, Leibniz Institute (IPN) Kiel, Germany
Helmut Precht, University of Potsdam

The Social Psychology of Evolution Denial

Leonard Bloch, UGA Department of Science Education, lenbloch@uga.edu

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Science Learning and Science-related Identities, Interests, and Attitudes

2:45pm – 4:00pm, Río Mar Salon 10

Presider:

Audrey De Zeeuw

Extending the Analysis of Student Role Identities across Geographical and Subject Area Boundaries

Marie-Claire Shanahan, University of Alberta, mcshanahan@ualberta.ca
Martina Nieswandt, University of Massachusetts, Amherst

Large-Scale Validation of an Instrument to Assess Precollege Students' Attitudes toward Science

Ziad Said, College of the North Atlantic, Qatar,
ziad.said@cna-qatar.edu.qa

Fouad Abd-El-Khalick, University of Illinois at Urbana-Champaign
Ryan Summers, University of Illinois at Urbana-Champaign
Michael Culbertson, University of Illinois at Urbana-Champaign
Heather Friesen, College of the North Atlantic, Qatar

Factors that Affect Learning in High School Science; Measuring Motivation, Achievement, and Interest in Science

Steve Getty, Biological Sciences Curriculum Study, SGetty@BSCS.org
Chris Hulleman, University of Virginia
Kenneth E. Barron, JMU, Harrisonburg, VA
Molly Stuhlsatz, BSCS
Jane C. Marks, Northern Arizona University, Flagstaff AZ

Science-related Aspirations from Late Primary to Early Secondary School: The More Things Change. . .

Jennifer DeWitt, King's College London, jennifer.dewitt@kcl.ac.uk
Louise Archer, King's College London
Jonathan F. Osborne, School of Education, Stanford University

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Issues Related to Science Teaching and Instruction

2:45pm – 4:00pm, Caribbean Salon 2

Presider:

Leah Bricker, University of Michigan

Fostering Scientific Inquiry with Experimental Worked Examples

Jenna Säger, University of Duisburg-Essen, jenna.saenger@uni-due.de
Markus Emden, University of Duisburg-Essen
Elke Sumfleth, University of Duisburg-Essen

Pre-service Teachers' Dialogues on Local Environmental Problems: A Case Study of Presumptive Argumentation on Socioscientific Issues

Mijung Kim, University of Victoria, mjkim@uvic.ca
Robert Anthony, University of Victoria
David Blades, University of Victoria

Education for Sustainability: A Sustainable Model for Primary Teacher Candidates?

Michelle L. Klosterman, University of Missouri,
klostermanml@missouri.edu
Krsitin Redington Bennett, {in}Mind Consulting

Modifying Eighth Grade Science Students' Views of Learning: A Quasi-experiment Investigating the Impact of Instruction

Jesse L. Wilcox, Iowa State University, jwilcox.23@gmail.com
Jerrid W. Kruse, Drake University
Benjamin C. Herman, University of South Florida

Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies

Elementary Teachers' Growth in Science Teaching

2:45pm – 4:00pm, Río Mar Salon 3

Presider:

Deborah C. Peek-Brown

Elementary Teachers' Ideas about, Planning for, and Implementation of Learner-Guided and Teacher-Guided Inquiry

Mandy Biggers, University of Iowa, mandy-biggers@uiowa.edu
Cory T. Forbes, University of Iowa
Laura Zangori, University of Iowa

Elementary Science Teachers' Use of Educative Curriculum Materials to Engage Students in Sensemaking Discussions

Amanda Benedict-Chambers, University of Michigan, mbenedi@umich.edu
Sylvie M. Kademian, University of Michigan
Elizabeth A. Davis, University of Michigan
Annemarie S. Palincsar, University of Michigan

A Professional Development Intervention's Effectiveness on Elementary Teachers' Science Content Knowledge and Student Achievement Outcomes

Brandon S. Diamond, University of Miami, b.diamond@umiami.edu
Jaime Maerten-Rivera, University of Miami
Okhee Lee, New York University

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies

Related Paper Set - Examining the Nature and Assessment of Secondary Science Teachers' Topic Specific Pedagogical Content Knowledge

2:45pm – 4:00pm, Pelican Room

Presider:

Julie Gess-Newsome, Willamette University

Discussant:

Jan H. Van Driel, Leiden University

The Development of Beginning Biology Teachers' PCK for Teaching Natural Selection

Aaron J. Sickel, Ohio University, sickel@ohio.edu
Patricia J. Friedrichsen, University of Missouri
Julie Gess-Newsome, Willamette University
Jan H. Van Driel, Leiden University

The Implementation of Topic-Specific PCK in a Chemistry Pre-Service Programme

Elizabeth Mavhunga, University of the Witwatersrand,
Elizabeth.Mavhunga@wits.ac.za
Marissa S. Rollnick, University of the Witwatersrand

PCK by CoRes and PaP-eRs for Teaching Acids and Bases at High School

Andoni Garriz, Universidad Nacional Autonoma de Mexico, andoni@servidor.unam.mx
Clara Alvarado, Universidad Nacional Autonoma de Mexico
Florentina Canada, Universidad de Extremadura
Vicente Mellado, Universidad de Extremadura

Development and Validation of a Survey Measure of Secondary Teachers' Topic Specific PCK

Soonhye Park, University of Iowa, soonhye-park@uiowa.edu
Jeekyung Suh, University of Iowa
Kyungwoon Seo, University of Iowa
Tina Vo, University of Iowa

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies

Symposium - Teachers' Views of 21st Century Content Themes, Skills, and Contexts: An International Perspective

2:45pm – 4:00pm, San Cristobal

Discussant:

Justin Dillon, King's College London, UK

Presenters:

Sara L. Salloum, Long Island University, Brooklyn, New York, sara.salloum@liu.edu
Danielle E. Dani, Ohio University, Athens, Ohio
Saouma Boujaoude, American University of Beirut, Lebanon
Rola Khishfe, American University of Beirut, Lebanon
Nader Wahbeh, A. M. Qattan Foundation, Palestine
Nasser Mansour, University of Exeter, UK
Justin Dillon, King's College London, UK
Saeed Alshamrani, King Saud University, Saudi Arabia

Strand 5: College Science Teaching and Learning (Grades 13-20)

Pedagogical Approaches to Science Teaching

2:45pm – 4:00pm, Parrot Room

Presider:

Sanghee Choi, University of North Georgia

Scientific Humor in University Lectures

Francine Wizner, Albany University, imnotfran@hvc.rr.com
Alandem W. Oliveira, University at Albany, SUNY

Student Writing Reveals Their Heterogeneous Thinking about the Origin of Genetic Variation in Populations

Luanna B. Prevost, Michigan State University, prevostl@msu.edu
Jennifer K. Knight, University of Colorado - Boulder
Michelle K. Smith, University of Maine
Mark Urban-Lurain, Michigan State University

Re-examining the Foundations of Expert-Novice Categorization Experiments

Steven F. Wolf, Michigan State University, wolfste4@msu.edu
Daniel P. Dougherty, Lyman Briggs College Michigan State University
Gerd Kortemeyer, Michigan State University

Strand 6: Science Learning in Informal Contexts

Impact of Professional Development on Out-of-School Educators

2:45pm – 4:00pm, Sea Gull Room

Presider:

Natalie Swayze

Crowd-sourced Bibliographic Review of Family Learning Research: A Viable Strategy?

Ana K. Houseal, University of Wyoming, ahouseal@uwyo.edu
 Matthew C. Wenger, Oregon State University
 Colleen Bourque, University of Wyoming
 John H. Falk, Oregon State University
 Lynn D. Dierking, Oregon State University

Professional Development for Informal Science Educators: A Collaborative Model

Amy Cox-Petersen, California State University, Fullerton, acox@fullerton.edu
 Natalie Tran, California State University, Fullerton
 Maria Grant, California State University, Fullerton
 Michelle Vanderveldt, California State University, Fullerton
 James F. Kisiel, California State University, Long Beach

Teacher Satisfaction and Science Content Learning during Professional Development at an Informal Science Institution

Gary M. Holliday, The University of Akron, gholliday@uakron.edu
 Norman G. Lederman, Illinois Institute of Technology
 Judith S. Lederman, Illinois Institute of Technology

Strand 7: Pre-service Science Teacher Education

Argumentation in Science Teaching

2:45pm – 4:00pm, Río Mar Salon 9

Presider:

Maria Evagorou

Enhancing Argumentative Discourse through Model Based Teaching

Deniz Eren Belek, Marmara University, fbekiroglu@marmara.edu.tr
 Feral Ogan-Bekiroglu, Marmara University

Engaging Pre-service Teachers in Argumentation in an Upper Level Physical Science Content Course

Victoria Deneroff, Georgia College & State University, victoria.deneroff@gcdsu.edu
 Rosalie A. Richards, Georgia College & State University
 Karynne L. Kleine, Georgia College & State University

Pre-service Science Teachers' Understanding and Evaluation of Arguments

Ebru Kaya, Selcuk University, ebrukaya@gmail.com
 Sibel Erduran, University of Bristol
 Pinar S. Cetin, Abant Izzet Baysal University

Strand 7: Pre-service Science Teacher Education

Understanding Preservice Teachers' Challenges

2:45pm – 4:00pm, Canary Room

Presider:

Carolyn S. Wallace

Conflict Negotiation: Pre-service Teachers Attempts to Implement

John L. Bencze, University of Toronto
 Darren G. Hoeg, University of Toronto

Preservice Science Teachers' Nature of Science Misconceptions and Epistemological Beliefs about Physical Science

Yusuf Sulun, Mugla University, syusuf@mu.edu.tr
 Aylin Cam, Mugla University
 Mustafa S. Topcu, Mugla Sitki Kocman University

Emotional Climate in Pre-service Science Teacher Education

Alberto Bellocchi, Queensland University of Technology, alberto.bellocchi@qut.edu.au
 Stephen M. Ritchie, Queensland University of Technology
 Kenneth G. Tobin, The City University of New York
 Donna King, Queensland University of Technology
 Maryam Sandhu, Queensland University of Technology
 Senka Henderson, Queensland University of Technology

Strand 8: In-service Science Teacher Education

Symposium - Teacher Professional Learning in the Digital Age

2:45pm – 4:00pm, Río Mar Salon 4

Presider:

Marian Pasquale, Education Development Center

Discussant:

Janet Carlson, BSCS

Presenters:

Lauren B. Goldenberg, EDC Center for Children & Technology, lgoldenberg@edc.org
 Marian Pasquale, Education Development Center
 Al Byers, National Science Teachers Association
 Jackie Miller, Education Development Center
 Sue Doubler, TERC
 Rob Steiner, American Museum of Natural History
 Arthur Eisenkraft, University of Massachusetts-Boston

Strand 9: Reflective Practice

Reflective Writing

2:45pm – 4:00pm, Heron Room

Presider:

Gillian U. Bayne

Our Story: Improved Practice through Teacher-research, Presentations, and Reflective Writing

Mary E. Hobbs, Center for STEM Education, maryhobbs@utexas.edu

Robert Williams, University of Texas

James P. Barufaldi, The University of Texas at Austin

Using Culture and Writing to Teach Science Content to Preservice Teachers

Line A. Saint-Hilaire, Queens College, CUNY,

Line.Augustin@qc.cuny.edu

Reconfiguring the Urban Science Experience: The Power of Diversity, Social Context, and the Local Environment

Erin A. Hashimoto-Martell, Boston College/Boston Public Schools, hashimer@bc.edu

Michael J. Clinchot, Boston Public Schools

Fiona Bennie, Boston Public Schools

Haven Daniels, Boston Public Schools

Policy and Practice: Reflective Diaries of Teachers and Teacher Trainers in an Inclusive Curriculum Project

Meshach M. Ogunniyi, University of the Western Cape,

mogunniyi@uwc.ac.za

Strand 10: Curriculum, Evaluation, and AssessmentDevelopment and Validation of Learning Progressions:
Examples and Tensions

2:45pm – 4:00pm, Río Mar Salon 2

Presider:

Knut Neumann

Learning Progressions as Tools for Evaluation: Assessment of Contextualizing Instruction in a Project-based Chemistry Curriculum

Kathryn F. Drago, East Carolina University, dragok@ecu.edu

Challenges in Developing Classroom Assessments Linked to Multidimensional Learning Progressions

Erin M. Furtak, University of Colorado at Boulder,

erin.furtak@colorado.edu

Deborah Morrison, University of Colorado at Boulder

Heidi Iverson, University of Colorado Denver

Michael J. Ross, University of Colorado - Boulder

Development of a Learning Progression for Water Cycling with Ordered Multiple Choice Items for Korean Elementary Students

Seungho Maeng, Kangwon National University, Korea, seunghom@gmail.com

Yeonseon Seong, Seoul National University of Education, Korea

Shinho Jang, Seoul National University of Education, Korea

Towards the Validation of a Learning Progression for the Concept of Matter

Jan Christoph Hadenfeldt, IPN Uni Kiel, hadenfeldt@ipn.uni-kiel.de

Knut Neumann, Leibniz Institute for Science Education (IPN) Kiel

A Longitudinal Assessment of a Learning Progression for Structure-Property Relationships – Chemistry, Life, the Universe, and Everything (CLUE)

Sonia M. Underwood, Clemson University, sunderw@clemson.edu

Melanie M. Cooper, Clemson University

Leah M. Corley

Strand 11: Cultural, Social, and Gender Issues

Related Paper Set - Leveraging an Online Scientific

Community to Enhance Contextual Science Education

2:45pm – 4:00pm, Río Mar Salon 8

An Online Membership Organization to Promote and Enhance Science Education in Puerto Rico

Giovanna Guerrero-Medina, giovanna.guerrero@gmail.com

Greetchen Díaz-Muñoz

Samuel Díaz-Muñoz,

Monica Feliú-Mójer

Jacqueline Flores-Otero

Yaihara Fortis-Santiago

Wilson González-Espada

Marcos López-Casillas

CienciaPR: Science Education through Media and Informal Settings

Monica Feliú-Mójer, moefeliu@cienciapr.org

Giovanna Guerrero-Medina

Daniel Colón-Ramos

Marcos López-Casillas

Jacqueline Flores-Otero

Wilson González-Espada

Yaihara Fortis-Santiago

Greetchen Díaz-Muñoz

Samuel Díaz-Muñoz

Ciencia Boricua: A Culturally Relevant Science Book

Pablo Llerandi-Román, llerandp@gvsu.edu

Daniel Colón-Ramos

Monica Feliú-Mójer

Wilson González-Espada

Impact of “Ciencia Boricua” on Science Teachers’ Professional Development

Yaihara Fortis-Santiago, yfortis@brandeis.edu
 Monica Feliú-Mójer
 Daniel Colón-Ramos
 Wilson González-Espada

Impact of “Ciencia Boricua” on Elementary and Middle Students’ Perception of Science

Wilson González-Espada, wgonzalez-espada@moreheadstate.edu
 Yaihara Fortis-Santiago
 Giovanna Guerrero-Medina
 Nicole Ortiz-Vega
 Daniel Colón-Ramos
 Monica Feliú-Mójer

Strand 14: Environmental Education

Using Authentic Data to Teach and Learn Environmental Concepts

2:45pm – 4:00pm, Río Mar Salon 7

Presider:

William C. Kyle, Jr., University of Missouri – St. Louis

Improving College Science Students’ Data Skills through a Short-Term Stream Sampling and Graphing Unit

Mikaela Schmitt-Harsh, Carleton College, mschmitt@carleton.edu
 Joseph A. Harsh, Indiana University School of Education

Ecology Disrupted: The Impact on Student Learning of Linking Ecological Function to Human Impact

Yael Wyner, City College of New York, ywyner@ccny.cuny.edu
 Jonathan Becker
 Bruce Torff
 Janice Koch, Hofstra University

An Authentic Climate Change Research Experience for Secondary Students at the Camuy Cave, Puerto Rico

Vanessa Vernaza-Hernández, University of South Florida, vanessav@mail.usf.edu
 Allan Feldman, University of South Florida
 Bogdan Onac, University of South Florida
 Angela Chapman, University of South Florida
 Dilek Özalp, University of South Florida
 Faye Alshehri, University of South Florida
 Juan Carlos Millán, University of South Florida

Strand 15: Policy

Symposium - STEM Educational Reform State of the Scene - Challenges, Successes, and Moving Forward

2:45pm – 4:00pm, El Morro 1 & 2

Presider:

Carla C. Johnson, University of Cincinnati

Presider:

Carla C. Johnson, University of Cincinnati, carla.johnson@uc.edu
 Charlene M. Czerniak, The University of Toledo
 Catherine M. Koehler, Southern Connecticut State University
 Toni A. Sondergeld, Bowling Green State University
 Andrea R. Milner, Adrian College
 Abdulkadir Demir, Georgia State University

Break

4:00pm – 4:30pm, Río Mar Ballroom Foyer

Plenary Session #1

Design, Make, Play: Growing the Next Generation of STEM Innovators

4:30pm – 5:50pm, Río Mar Ballroom 5 and 6

Presider:

Sharon Lynch, George Washington University

Keynote Presenter:

Margaret Honey, New York Hall of Science, NYC

Evening/Social Events

Membership and Elections Committee Sponsored Session

Mentor-Mentee Nexus

Informal discussion: Early career NARST members are matched with more seasoned members to help launch or expand professional networks.

6:00pm – 7:00pm, Río Mar Salon 2

Presenters:

Mike Smith, Mercer University, SMITH_MU@mercer.edu

Gale Baker, Arizona State University

Research Interest Groups (RIGs) Meetings

The Continental and Diasporic Africa in Science Education RIG (CADASE)

6:00pm – 7:00pm, Río Mar Salon 3

The mission of CADASE is to support research in science education that will have a positive impact on the lives of children of African ancestry. This is accomplished by (a) encouraging science educators to engage in research aimed at meeting the needs of people of African ancestry; and (b) providing intellectual, professional, and personal space for science educators engaged in such research.

Presenters:

Mary M. Atwater, The University of Georgia, Director of CADASE

Jomo Mutege, Indiana University-Purdue University, Chair of the Steering Committee of CADASE

Engineering Education RIG (ENE-RIG)

The purpose of this new RIG is to synergize research in science and engineering education and provide a discussion space supporting intellectual and professional exchange and networking. At this initial RIG meeting we will: (a) review the goals of the ENE-RIG, (b) identify members and hold elections, (b) discuss future projects such as possible collaborations and paper sets for next year.

6:00pm – 7:00pm, Río Mar Salon 7

Presenter:

Senay Purzer, Purdue University, spurzer@purdue.edu

Latino/a RIG (LARIG)

The goals of this meeting are to (1) encourage, support, and provide opportunities for collaboration among science educators engaged in research for and with Latin@s in science education; (2) hold elections for LARIG officers; (2) develop goals for the coming year.

6:00pm – 7:00pm, Río Mar Salon 9

Presenters:

Alberto J. Rodriguez, Purdue University

Regina Suriel, University of Connecticut

Sara Tolbert, The University of Arizona

Presidential/Welcome Reception

Social Event: All NARST conference participants are welcome—free appetizers and cash bar.

7:00pm – 9:30pm, Vista Verde Garden

Sunday, April 7, 2013

Conference Registration**7:00am – 5:00pm, Río Mar Atrium****Committee Meetings****7:00am – 8:15am****Awards Committee Chairs & Co-Chairs Meeting****7:00am – 8:15am, Río Mar Salon 1****Equity and Ethics Committee Meeting****7:00am – 8:15am, Río Mar Salon 2****External Policy and Relations Committee Meeting****7:00am – 8:15am, Río Mar Salon 3****Research Committee Meeting****7:00am – 8:15am, Río Mar Salon 4****Membership and Election Committee Meeting****7:00am – 8:15am, Río Mar Salon 7****International Committee Meeting****7:00am – 8:15am, Río Mar Salon 8****Program Committee Meeting****7:00am – 8:15am, Río Mar Salon 9****Publications Advisory Committee Meeting****7:00am – 8:15am, Río Mar Salon 10****Concurrent Session #3****8:30am – 10:00am****Publications Advisory Committee Sponsored Session****Symposium - Reflections from Contemporary Researchers on the Influence of Past JRST Scholarship****8:30am-10:00am, Caribbean Salon 1*****Presiders:***

Carolyn S. Wallace, Indiana State University,

carolyn.wallace@indstate.edu

Julia D. Plummer, Pennsylvania State University

Discussant:

Angela Calabrese Barton, Michigan State University

Presenters:

Gregory J. Kelly, Penn State University

Troy D. Sadler, University of Missouri

Nancy B. Songer, University of Michigan

Katherine L. McNeill, Boston College

Strand 1: Science Learning, Understanding and Conceptual Change**Cognitive Development and Reasoning****8:30am-10:00am, Río Mar Salon 1*****Presider:***

Catherine Eberbach

How Metacognitive Processes Regulate Cognitive Processes In Self-Developed Explanatory Models of Magnetic PhenomenaMeng-Fei Cheng, National Changhua University of Education,
mcheng2@cc.ncue.edu.tw

David E. Brown, University of Illinois at Urbana-Champaign

Elementary Students Use of Argumentation and Evidentiary Support In Science Notebooks

Eric N. Wiebe, North Carolina State University, eric_wiebe@ncsu.edu

Angela Shelton, North Carolina State University

Lindsay Patterson, North Carolina State University

Megan Hardy, North Carolina State University

Mike Carter, North Carolina State University

Chip Sheffield, North Carolina State University

Embodied Modeling of a Bioinspired Kinetic Assembly: Visual, Aural And Kinesthetic**Representations of Strandbeest Locomotion**

Gokul Krishnan, Vanderbilt University, gokul.krishnan@vanderbilt.edu

Size And Scale Tasks and Their Relation To Evolutionarily-Based And Culturally-Based Knowledge

Cesar Delgado, University of Texas at Austin,
Cesar_Delgado@austin.utexas.edu
Gail M. Jones, North Carolina State University
Hye Sun You, University of Texas at Austin
Laura E. Robertson, East Tennessee State University
Justin Halberda, Johns Hopkins University

Critical Transitions In Coming to Understand Natural Selection

Stephanie Sisk-Hilton, San Francisco State University,
stephsh@sfsu.edu
Eric Berson, University of California, Berkeley
Kathleen E. Metz, University of California, Berkeley

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Science Learning and the Importance of Authenticity and Relevancy

8:30am-10:00am, Caribbean Salon 2

Presider:

Mei-Hung Chiu

Authentic Classroom Science Using Scientist-Mentors: Successes and Challenges in Blending Online and Laboratory Learning

Stephen C. Scogin, Texas A&M University, scs2639@tamu.edu
Carol L. Stuessy, Texas A&M University
Gokhan Ozturk, Texas A&M University
Cheryl A. Peterson, Texas A&M University

Recommendations for the Development and Use of Visualizations in Science Teaching

Linda M. Phillips, University of Alberta, linda.phillips@ualberta.ca
Stephen P. Norris, University of Alberta

Catalyzing Involvement in Student Research with Science Fairs: Case Studies of Exemplary Programs

Peter Rillero, Arizona State University, rillero@asu.edu
Jon K. Price, Research & Evaluation Intel® Corporation

Beyond Hands-on: The Importance of Relevance and Discussion in Promoting Students' Interest in School Science

Jennifer Jocz, National Institute of Education, jennifer.tan@nie.edu.sg
Junqing Zhai, National Institute of Education
Aik-Ling Tan, National Institute of Education

Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies

Literacy in Elementary Science

8:30am-10:00am, Río Mar Salon 3

Presider:

Sarah J. Brasiel

Elementary Teachers' Views of the Role of Literacy in Science

Brian M. Donovan, Stanford University, briand79@stanford.edu
Michelle Friend, Stanford University
Michael Metz, Stanford University
Jonathan F. Osborne, Stanford University
Alexis Patterson, Stanford University
Diego X. Roman, Stanford University

Cross-Subject Analysis On Questions In Elementary Science Textbooks and Japanese Language Textbooks in Japan

Manabu Sumida, Ehime University, msumida@ed.ehime-u.ac.jp
Chika Shimomiya, Fukuyama Myoodai High School

Blended / Tiered Approach to Teaching Academic Vocabulary Within a Two-Way Immersion Classroom

Cristina White, University of Nevada, cristina.white11@gmail.com
David T. Crowther, University of Nevada, Reno

The Development of Insightful Implementation of Science Notebooks

Lori Fulton, University of Hawaii at Manoa, fultonl@hawaii.edu
Janelle M. Bailey, University of Nevada, Las Vegas
David T. Crowther, University of Nevada, Reno
Jian Wang, University of Nevada, Las Vegas

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies

Investigating Teacher's Pedagogical Content Knowledge

8:30am-10:00am, San Cristobal

Presider:

Ava Zeineddin

Influence of Different School Types on Chemistry Teachers' PCK and CK

Oliver Tepner, University of Duisburg-Essen, Germany, oliver.tepner@uni-due.de

When Teaching Makes Difference - Developing Science Teachers' Pedagogical Content Knowledge (PCK) Through the Approach of Learning Study

Pernilla Nilsson, Halmstad University, pernilla.nilsson@hh.se

A Scienceteacher'S PCK: Those Who Can, Do. Those Who Understand, Teach.

Dilek Karisan, Middle East Technical University,
dilekkarisan@gmail.com
Ayse Senay, Middle East Technical University
Behiye Ubuz, Middle East Technical University

PCK Change Over Time: Assessment of Within Field and Out-of-Field Teachers Across Content Disciplines

Charles Weeks, Arizona State University, cbweeks@asu.edu
Kathleen M. Hill, Arizona State University

Teacher Knowledge Versus Student Learning In Context-Based Chemistry Education: PCK-Related Analyses of Student Data

Ineke Henze-Rietveld, University of Technology Delft,
ineke.henze@ziggo.nl
Erik Barendsen, Radboud University Nijmegen, ILS-RU

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies

Factors Affecting Teachers' Use of Inquiry and Questioning Skills

8:30am-10:00am, Pelican Room

Presider:

Christine Lotter, University of South Carolina

Effects of Level of Openness in Inquiry Teaching on Student Science Achievement and Attitudes: Evidence from Propensity Score Analysis with Pisa 2006 U.S. Data

Feng Jiang, New York University, fj3@nyu.edu
William F. McComas, University of Arkansas

From Research to Practice: Fostering Pre-Service Science Teachers' Skills in Facilitating Effective Whole Class Discussions

Grant Williams, St. Thomas University, grantw@stu.ca

Characterizing the Relationship Between High-Quality Task Setup and Teachers' Instructional Practices During Lessons Incorporating Scientific Practices

Carrie-Anne Sherwood, University of Michigan, casher@umich.edu
Savitha Moorthy, SRI International
Carrie A. Bemis, University of Colorado - Boulder
Christopher J. Harris, SRI International

Impact of a Professional Development Program on Middle School Teachers' Inquiry Teaching Efficacy

Christine R. Lotter, University of South Carolina, lotter@mailbox.sc.edu
Stephen Thompson, University of South Carolina
Tammiee Dickenson, University of South Carolina
Grant Morgan, University of South Carolina

The Distinction Between Experimental and Historical Sciences as a Framework for Improving Classroom Inquiry

Ron Gray, Northern Arizona University, ron.gray@nau.edu

Strand 5: College Science Teaching and Learning (Grades 13-20)

Innovative Pedagogies for College Science Learning

8:30am-10:00am, Parrot Room

Investigating the Effect of Peer Teachers on Learning Environments in Large STEM Courses

Meredith T. Knight, Boston University, mtknight@bu.edu
Peter S. Garik, Boston University
Adam Moser, Boston University
Nic Hammond
Manher Jariwala, Boston University
Kathryn Spilios, Boston University
Angela Seliga, Boston University
Nick Gross, Boston University
Dan Dill, Boston University
Bennett Goldberg, Boston University

Impacting The Scientific Reasoning Abilities Of STEM Majors Through An Introductory Physics Laboratory Course

Kathleen M. Koenig, University of Cincinnati, kathy.koenig@uc.edu
Carol Fabby, University of Cincinnati
Larry Bortner, University of Cincinnati

Promoting Scientific Literacy of Bio-Medical Engineering Students Via Reading Research Articles and Online Discussions

Yehudit J. Dori, Technion-Israel Institute of Technology, yjdori@technion.ac.il
Amira Allouche, Technion-Israel Institute of Technology
Hagit Yarden, Technion-Israel Institute of Technology

Strand 6: Science Learning in Informal Contexts

Influence of Informal Learning Environments for Future Education and Careers

8:30am-10:00am, Sea Gull Room

Presider:

Jennifer DeWitt

A Qualitative Examination of the Components of Family Encouragement Associated with Science Interest

Devasmita Chakraverty, University of Virginia, dc5na@virginia.edu
Robert H. Tai, University of Virginia

Exploring Benefits of an International Science

Olympiad: STEM Career Interests

Alpaslan Sahin, Texas A&M University, sahin_alpaslan@yahoo.com
 Ozcan E. Akgun, Sakarya University, Turkey
 Niyazi Erdogan, Texas A&M University
 Mehmet Oren, Texas A&M University
 Robert M. Capraro, Texas A&M University
 Mary Margaret Capraro, Texas A&M University

Critical Experiences that Fostered Choice of Geoscience Careers

Heather A. Pacheco, Arizona State University,
pacheco.heather@gmail.com
 Nicole D. LaDue, Michigan State University

Science Research Experience in a Museum: Early Evidence for Impact on College Readiness for Science

Alix Cotumaccio, American Museum of Natural History
 Preeti Gupta, American Museum of Natural History
 Jacqueline DeLisi, Education Development Center, Inc
 Hilleary Osheroff, American Museum of Natural History

The Long-Term Impact of a Summer Science Academy Experience

Karen B. Marshall, Washington Adventist University,
kmarshall@wau.edu

Strand 7: Pre-service Science Teacher Education

Reflective Practices in Preservice Teacher Education

8:30am-10:00am, Río Mar Salon 9

President:

Anna Lewis, University of South Florida

Quality of Pre-Service Teachers' Reflections in Their Portfolios and Their Perceived Reflections: Do They Intersect?

Feral Ogan-Bekiroglu, Marmara University, feralogan@yahoo.com

Use of Evidence and Standards-Based Reflection in Elementary Science Methods

Wendy P. Ruchti, Idaho State University College of Education,
ruchwend@isu.edu

Activity System as a Lens to Understand Pre-Service Science Teacher Reflection

Anton Puvirajah, Georgia State University, apuvirajah@gsu.edu
 Brett Criswell, Georgia State University

The Role of Video Analysis in the Preparation of Reflective Science and Mathematics Teachers

Maria S. Rivera Maulucci, Barnard College, mriveram@barnard.edu

Strand 7: Pre-service Science Teacher Education

Understanding and Developing Identities in Science
 Classrooms

8:30am-10:00am, Canary Room

President:

Leigh A. Haefner

Storied Strategies: How Teacher Candidates' Storied Identities Leveraged their Teacher Learning

Amal Ibourk, Michigan State University, ibourkam@msu.edu

Exploring Pre-Candidate Teachers' Identity Formation

Jaime Sabel, University of Iowa, jaime-sabel@uiowa.edu
 Nurcan Keles, University of Iowa
 Soonhye Park, University of Iowa
 Eulsun Seung, Indiana State University

Potential Science Teachers' Understanding of Students: Contrasts by Gender, Ethnicity, Language, and Major

Julie A. Bianchini, University of California, Santa Barbara,
jbianchi@education.ucsb.edu
 Hilary A. Dwyer, University of California, Santa Barbara
 Ashley Iveland, University of California, Santa Barbara
 Ethny A. Stewart, University of California, Santa Barbara

Blogging and the Development of Science Teacher Identity in Pre-Service Elementary Teachers

Steven D. Wall, UNC - Chapel Hill, sdwall@email.unc.edu
 Janice L. Anderson, University of North Carolina at Chapel Hill

Strand 8: In-service Science Teacher Education

Related Paper Set - Promoting Interdisciplinary Science
 Teaching and Learning in Schools

8:30am-10:00am, Río Mar Salon 4

President:

Xiufeng Liu, State University Of New York At Buffalo (SUNY)

Understanding Meanings of Interdisciplinary Science Inquiry in an Era of Next Generation Science Standards

Xiufeng Liu, State University of New York At Buffalo (SUNY),
xliu5@buffalo.edu

The Development of Interdisciplinary Inquiry Curriculum Knowledge

Erica L. Smith, State University of New York at Buffalo (SUNY),
elsmith4@buffalo.edu

Examining Science Teacher's Development of Interdisciplinary Science Inquiry Pedagogical Knowledge and Practices

Bhawna Chowdhary, State University of New York at Buffalo (SUNY),
bc@buffalo.edu

Understanding In-Service Teachers' Orientation Towards Interdisciplinary Science Inquiry

Vanashri Nargund-Joshi, State University of New York at Buffalo (SUNY), vanashri@buffalo.edu

STEM Students as Facilitators of Interdisciplinary Science Inquiry Teaching and Learning

Brooke Grant, State University of New York at Buffalo (SUNY),
bgrant@buffalo.edu

Strand 9: Reflective Practice

Way of Knowing Science

8:30am-10:00am, Heron Room

President:

Nancy G. Caukin

The Will of the Ancestors: A Collaborative Elementary Science Curriculum Design Initiative

Irasema Ortega, University of Alaska-Anchorage,
iortega2@uaa.alaska.edu

Naqacin Ayuluk, Kashunamiut School District

Apala Ayuluk, Kashunamiut School District

Cathy Coulter, University of Alaska, Anchorage

Rebecca Nayamin, Kashunamiut School District

Crossing Through Nepantla on the Way to Science Learning and Teaching

Deborah Roberts-Harris, University of New Mexico,
drober02@unm.edu

Jean Rockford Aguilar-Valdez, University of North Carolina,
Greensboro

Carlos A. LopezLeiva, University of New Mexico

Diane Torres-Velasquez, University of New Mexico

Gilberto Lobo, Albuquerque Public Schools

Carol Westby, University of New Mexico

A Case Study on In-Service Teachers' NOS Views and NOS Teaching in Turkish Context

Seda Cavus, Giresun University, sdacavus@gmail.com

Jale Cakiroglu, Middle East Technical University

Nihal Dogan, Abant Izzet Baysal University

Kader Bilican, Ataturk University

Promoting College Students' Argumentation Skills and NOS Understanding Through Class Debate

Jianlan Wang, Indiana University, hurricane355wjl@gmail.com

Gayle A. Buck, Indiana University

Strand 10: Curriculum, Evaluation, and Assessment

Symposium - Using the FCI to Conceptualize Learning Progressions of the Force Concept: Content and Measurement Challenges

8:30am-10:00am, El Morro 1 & 2

President:

Gavin W. Fulmer, National Institute of Education

Discussant:

David L. Fortus, Weizmann Institute of Science

Presenters:

Gavin W. Fulmer, National Institute of Education,
gavin.fulmer@nie.edu.sg

Irene Neumann, Ruhr-Universität Bochum

Ling L. Liang, La Salle University

Knut Neumann, Leibniz Institute for Science Education (IPN) Kiel

Jim E. Minstrell, FACET Innovations

Strand 10: Curriculum, Evaluation, and Assessment

Research on Teachers' Instructional Practices and Learning Communities

8:30am-10:00am, Río Mar Salon 2

President:

Ann E. Rivet, Teachers College

Professional Learning Communities (PLCs) a Means for Science Curriculum Change

Christi L. Browne, Columbia Teachers College,

christibrowne@gmail.com

Ann E. Rivet, Teachers College Columbia University

Looking at Quality of Instruction and Students' Performance: Where do the Teachers' Questions Come From?

Maria Araceli Ruiz-Primo, University of Colorado Denver,
maria.ruiz-primo@ucdenver.edu

Min Li, University of Washington

Erich Birby, University of Colorado Denver

Ashley Edwards, University of Colorado Denver

Ting Wang, University of Washington

Derek Yiran Zhao, University of Washington

Michael Giamellaro, University of Colorado Denver

Use of Social Network Analysis to Study Teacher Communities in Design Based Implementation Research

Bill Zoellick, Schoodic Education & Research Center Institute,
bill@sercinstitute.org

Jonathan Shemwell, University of Maine

Daniel K. Capps, University of Maine

Shirly Avargil, University of Maine

Video Analysis of Science Teaching: Developing a Shared “Words-To-Images” Analytical Tool

Molly Stuhlsatz, BSCS, mstuhlsatz@bscs.org
 April L. Gardner, BSCS
 Kathleen J. Roth, BSCS

Strand 11: Cultural, Social, and Gender Issues

Related Paper Set - Attending to the Intellectual Repertoires of Diverse Teachers and Students in Teacher Learning

8:30am-10:00am, Río Mar Salon 8

Discussant:

Maria Varelas, University of Illinois at Chicago

Developing Ambitious and Culturally Responsive Science Teaching Practices with Pre-Service Teachers

Gale A. Seiler, McGill University, gale.seiler@mcgill.ca

Speaking Up and Making Sense of Who I Am

Felicia M. Mensah, Teachers College, Columbia University, moorefe@tc.columbia.edu

Getting to the Root: Assessing Teachers’ Understandings of Classroom Discourse in a Practice-Based Inquiry Seminar

Eli Tucker-Raymond, TERC, eli_tucker-raymond@terc.edu
 Ann S. Rosebery, TERC
 Beth Warren, TERC
 Christopher G. Wright, TERC
 Folashade Cromwell Solomon, TERC

Integrating Science and Literacy in Urban Elementary Classrooms: Teachers and Children Making Meaning

Justine M. Kane, Wayne State University, jmkane@wayne.edu

Strand 14: Environmental Education

Preservice Teachers’ Perceptions in Teaching and Knowing about the Environment

8:30am-10:00am, Río Mar Salon 7

Presider:

Line A. Saint-Hilaire

Is Science Inherently Green? Improving Preservice Teacher Attitudes Towards Science Doesn’t Change their Environmental Worldview.

Bryan Nichols, University of South Florida, bryanhnichols@gmail.com

A Sociocultural, Regional Comparison: Pre-Service Elementary Teachers’ Outdoor Experiences

Patricia Patrick, Texas Tech University, trish.patrick@ttu.edu
 Erica Blatt, College of Staten Island

A Sociocultural Analysis of Pre-Service Elementary Teachers’ Perceived Obstacles in Taking Students Outdoors

Erica Blatt, College of Staten Island, erica.blatt@csi.cuny.edu

Strand 15: Policy

Elementary Science Teaching: Intersection of Policy & Practice

8:30am-10:00am, Río Mar Salon 10

Presider:

Sarah J. Carrier

The Impact of the Principal in the Implementation of Promoting Science Among English Language Learners

Resma N. Chamadia, Corona Norco USD, drresma@gmail.com
 Kimberly S. Lanier, University of Miami
 Amy Cox-Petersen, California State University, Fullerton

Principal Support: Does it Influence Teachers’ Science Instructional Practices During a Science Intervention?

Kimberly S. Lanier, University of Miami, k.lanier@miami.edu
 Marietta Suarez, University of Miami
 Soyeon Ahn, University of Miami
 Okhee Lee, New York University
 Todd L. Hutner, The University of Texas at Austin

An Exploration of Science Teaching Practices Among Elementary Teachers Implementing Three Comprehensive School Reform Models

Jessica Gale, Georgia Institute of Technology - CEISMC, jessica.gale@ceismc.gatech.edu

School Organization Factors Associated with Reducing Science Achievement Inequities: Instrument Development to Support Large-Scale Comparisons

Regina Surriel, University of Connecticut, regina.suriel@uconn.edu
 John Settlege, University of Connecticut

Concurrent Session #4 10:15am – 11:45am

Awards Committee Sponsored Session

Symposium - NARST Outstanding Doctoral Research Award

10:15am-11:45am, El Morro 1 and 2

Judith Lederman, Illinois Institute of Technology, ledermanj@iit.edu
 Meg Blanchard, North Carolina State University

Equity and Ethics Committee Sponsored Session

Symposium - New Scholar Symposium: STEM Education - Social, Cultural, Epistemological, and Pedagogical Issues

10:15am - 11:45am, Caribbean Salon 1

Presenters:

Felicia Moore Mensah, Teachers College
 Maria S. Rivera Maulucci, Barnard College
 Lisa Martin-Hansen, Georgia State University
 Geeta Varma, University of Colorado, Denver
 Deb Morrisson, University of Colorado, Boulder

Scholars:

Nancy Albrecht, University of Minnesota-Twin Cities
 Geraldine L. Cochran, Florida International University
 David T. Brookes, Florida International University
 Laird H. Kramer, Florida International University
 Eric Brewie, Florida International University
 Yeni Violeta Garcia, University of Northern Colorado
 Salina Gray, Stanford University
 Mary H. Hoelscher, University of Minnesota
 Natasha Johnson, University of Georgia
 Tamecia Jones, Purdue University
 Andrea Motto, Virginia Tech
 Alexis Patterson, Stanford University
 Cassie Quigley, Clemson University
 Patrick Womac, Clemson University
 Kristina Maruyama Tank, University of Minnesota
 Alicia M. Trotman, Mercy College

Strand 1: Science Learning, Understanding and Conceptual Change

Disciplinary Features and Challenges in Biology Education

10:15am-11:45am, Río Mar Salon 1

Presider:

Michelle P. Cook

Elementary Students' Explanation Construction of Seed Structure and Function: A Concurrent Mixed Methods Study

Laura Zangori, University of Iowa, laura-zangori@uiowa.edu
 Cory T. Forbes, University of Iowa
 Mandy Biggers, University of Iowa

Exploring Younger Students' Understanding of Biological Inheritance

Joi Merritt, Michigan State University, jmerritt@msu.edu
 Kyle Erlenbeck, Michigan State University
 Michelle Williams, Michigan State University

Informing a Learning Progression in Genetics: Which Should be Taught First Mendel or DNA?

Ravit G. Duncan, Rutgers University, ravit.duncan@gse.rutgers.edu
 Moraima Castro, Rutgers University
 Madhavi Bhojraj, Rutgers University

The Effect of College Major and Biological Knowledge on Students' Acceptance of Common Health Misconceptions

Alla Keselman, National Library of Medicine, keselmana@mail.nih.gov
 Savreen Hundal, Center for Public Service Communication
 Yulia Chentsova-Dutton, Georgetown University
 Jay A. Edelman, City College of New York

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Symposium - Reading, Writing, and Communicating Science: Exploring the Intersections of Science and Literacy Education

10:15am-11:45am, Caribbean Salon 2

Presider:

Leah A. Bricker, University of Michigan, lbricker@umich.edu

Discussant:

Kim Gomez, University of California Los Angeles

Presenters:

Megan Bang, University of Washington
 Jasmine Alfonso, Northwestern University
 Lori Faber, Northwestern University
 Ananda Marin, Northwestern University
 Michael Marin, American Indian Center of Chicago
 Sandra Waxman, Northwestern University
 Jennifer Woodring, Northwestern University
 Douglas Medin, Northwestern University
 Tiffany R. Lee, Teaching Channel
 Katie Van Horne, University of Washington
 Philip Bell, University of Washington
 Elaine Klein, University of Washington
 Joseph L. Polman, University of Colorado Boulder
 Cathy Farrar, Rockwood School District
 Jennifer M.G. Hope, McKendree University

Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies

Engineering and Careers in Elementary Science

10:15am-11:45am, Río Mar Salon 3

Presider:

Deborah C. Smith, Pennsylvania State University

Exploring Engineering with Diverse Learners: A Mixed Methods Study Examining Variables Affecting Learning and Attitudes

Maya Israel, University of Illinois at Urbana Champaign, misrael@illinois.edu
 Shelly Micham, University of Cincinnati
 Kathie Maynard, University of Cincinnati

Engineering Design as an Instructional Strategy in the Elementary Science Classroom

Kathie Maynard, University Of Cincinnati, kathie.maynard@uc.edu
 Shelly Micham, University of Cincinnati

STEM Career Signals: What Influences 5th Grade Children's Aspirations?

Julie A. Thomas, Oklahoma State University, julie.thomas@okstate.edu
Melissa Hulings, Oklahoma State University
Cynthia Orona, Oklahoma State University

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies

Related Paper Set - Communication for Learning in K-12 Engineering Education

10:15am-11:45am, Pelican Room

Presider:

Christine Schnittka, Auburn University

Discussant:

Senay Purzer, Purdue University

Communication for Learning in K-12 Engineering Education

Christine Schnittka, Auburn University, schnittka@auburn.edu

An Efficacy Study of Computer-Aided Design Learning Tools in High School Engineering Classrooms

Charles Xie, The Concord Consortium, qxie@concord.org
Edmund Hazzard, The Concord Consortium
Rachel Kay, The Concord Consortium
Saeid Nourian, The Concord Consortium
Amy Pallant, The Concord Consortium

Middle Level Math and Science Teacher Perceptions from a University Research Experience

Karen A. High, Oklahoma State University, karen.high@okstate.edu
Juliana Utley, Oklahoma State University
Julie Angle, Oklahoma State University

Characterizing Argumentation Structures in High School Engineering Design

William McKenna, University of Texas Austin,
william@math.utexas.edu

Innovating Science Curricula with Engineering: A Balancing Act

Marion Usselman, Georgia Institute of Technology/CEISMC,
marion.usselman@ceismc.gatech.edu
Mike Ryan, Georgia Institute of Technology/CEISMC
Brian Gane, Georgia Institute of Technology/CEISMC
Sabrina Grossman, Georgia Institute of Technology/CEISMC

Strand 5: College Science Teaching and Learning (Grades 13-20)

Effect of Models on Student Understanding

10:15am-11:45am, Parrot Room

Presider:

Stephen B. Witzig

Effect of Plastic Models, Organ Dissections, and Virtual Dissections on Learning, Retention, and Science Perceptions

Sara A. Lombardi, University of Maryland, slombard1@umd.edu
Reimi E. Hicks, University of Maryland
Katerina V. Thompson, University of Maryland
Gili Marbach-Ad, University of Maryland

2D/3D: Exploring How Students Use Models to Solve Representational Translation Tasks in Organic Chemistry

Jeffrey T. Olimpo, University of Maryland, College Park,
jeolimp@umd.edu
Bonnie L. Dixon, University of Maryland

A Novel Typology for Alternative Conceptions in Postsecondary Chemistry Identified by a Two-Tier Diagnostic Instrument

Caroline Cormier, Universite De Montreal, carocorm@hotmail.com

Strand 5: College Science Teaching and Learning (Grades 13-20)

Diverse Approaches to Course Specific Pedagogy

10:15am-11:45am, San Cristobal

Presider:

Huseyin Colak

Shifting College Students' Epistemological Framing Using Hypothetical Debate Problems

Dehui Hu, Kansas State University, dehuihu@gmail.com
N. Sanjay Rebello, Kansas State University

The Effectiveness of the Cross-Age Peer Tutoring Program in Comparison to the Problem Solving Program in Introductory Physics Class

Kevin Insik Hahn, Ewha Womans University, ishahn@ewha.ac.kr
Shin Young Lee, Ewha Womans University
Jung Sook Yoo, Ewha Womans University
Eun Hee Kim, Ewha Womans University

New Ideas for Preparing University Teaching Assistants: Drawing from Secondary Science Teacher Education

Terry Lin, McGill University, terrylin.ca@gmail.com
Gale A. Seiler, McGill University

Development of Undergraduate Teaching Assistants as Effective Peer Mentors in STEM Courses

Stephanie B. Philipp, University Of Louisville, stephanie.philipp@louisville.edu
Thomas R. Tretter, University of Louisville
Christine Rich, University of Louisville

Strand 6: Science Learning in Informal Contexts

Critical Design Elements of Informal Contexts

10:15am-11:45am, Sea Gull Room

A Case Study of Understanding the Seasons in Informal LearningMi Song Kim, NTU, misong.kim@gmail.com

Wei Ching Lee, NTU

Using Visual Thinking Strategies and Live Animals in Natural Science Teaching in MuseumsJacqueline Genovesi, Drexel University, genovesi@ansp.org**The Role of the Physical Environment in Contextualizing Science Learning**

Michael Giamellaro, Oregon State University- Cascades,

michael.giamellaro@ucdenver.edu**Strand 7: Pre-service Science Teacher Education**

Symposium - Looking Past 2061: Visions of Science

Teacher Education for the Next Century

10:15am-11:45am, Canary Room

Discussant:

Melissa Braaten, University of Wisconsin-Madison

Presenters:

Douglas B. Larkin, Montclair State University,

larkind@mail.montclair.edu

Gillian Roehrig, University of Minnesota

Christopher Emdin, Teachers College Columbia University

Vicky K. Pilitsis, Rutgers University

Melissa Braaten, University of Wisconsin-Madison

Strand 7: Pre-service Science Teacher Education

Developing Content Knowledge and PCK

10:15am-11:45am, Río Mar Salon 9

Presenter:

Patricia J. Friedrichsen

Unintended Consequences: Pre-Service Science Teachers' Immersion In Modeling-Based Inquiry in Tropical EcologySarah J. Adumat, UW-Madison, sjadumat@wisc.edu

Jana L. Bouwma-Gearhart, University of Kentucky

Rebecca L. McNall, University of Kentucky

Allyson Rogan-Klyve, Oregon State University

What Role Does Content Knowledge Play in Learning to Teach Science?Gail Richmond, Michigan State University, gailr@msu.edu**Developing Pre-Service Science Teachers' PCK for Model-Based Instruction**Mehmet Aydeniz, The University of Tennessee, maydeniz@utk.edu

Monica C. Mobley, The University of Tennessee

Bennett A. Adkinson, University of Tennessee

Providing Meaningful Experience to Pre-Service Teachers: Mentoring Enriched PCK Based Practicum CourseAysegul Tarkin, Yuzuncu Yil University, atarkin@metu.edu.tr

Betul Demirdogen, Middle East Technical University

Sevgi AYDIN, Yuzuncu Yil University

Betul Ekiz, Middle East Technical University

Elif Selcan Kutucu, Middle East Technical University

Fatma N. Akin, Middle East Technical University

Mustafa TUYSUZ, Middle East Technical University

Esen Uzuntiryaki, Middle East Technical University

Strand 8: In-service Science Teacher Education

Promoting Professional Growth through Lesson Study

10:15am-11:45am, Río Mar Salon 4

Presenter:

Leslie Keiler

Developing Trust to Improve Elementary Science Teaching Through Lesson StudySharon Dotger, Syracuse University, sdotger@syr.edu

Kevin Moquin, Willow Field Elementary

Kathy Hammond, Willow Field Elementary School

Engaging Professional Development for High School Physics Teachers

Morten Lundsgaard, University of Illinois at Urbana Champaign,

mlundsga@illinois.edu

Christopher P. Cummings, College of Education

A Shift Towards Professional Learning from Professional Development: A Case of Bangladeshi Secondary Science TeachersHafizur Rahman, University of Dhaka, smhrahman9@yahoo.com

Strand 9: Reflective Practice

Professional Support / Development

10:15am-11:45am, Heron Room

Presider:

Lyn Carter

Engaging in Inquiry as Professional Development: Reconstructing Understandings of Research, Teaching, and Learning

Jeffrey S. Carver, West Virginia University, jeffrey.carver@mail.wvu.edu

Sharon B. Hayes, West Virginia University

Nadira I. Ghattas, West Virginia University

Digging Deeper Into Formative Assessment: Reflections from a Middle School Earth Science Teacher and Co-Designer

Yves Beauvineau, Denver Public Schools, beauvineau.yves@gmail.com

Angela H. DeBarger, SRI International

William R. Penuel, University of Colorado Boulder

Savitha Moorthy, SRI International

Making Your Own Role: Narrative Positioning Analysis of Science Department Chair Instructional Leadership Practice

Jeremy S. Peacock, University of Georgia & Monroe Area High School,
peacock.jeremy@gmail.com

Strand 10: Curriculum, Evaluation, and Assessment

Curriculum and Assessment for Student Learning:

Approaches in Secondary and Undergraduate Science

10:15am-11:45am, Río Mar Salon 2

Presider:

Mei-Hung Chiu

An Investigation of the Relationship Between High School Science Courses and First-Year College Outcomes

Pamela Kaliski, The College Board, pkaliski@collegeboard.org

Kelly Godfrey, The College Board

Visualization-Based Collaboration and Transactional Distance Among Students in a Mini-Project in Industrial Engineering Course

Niva Wengrowicz, Bar Ilan university, nivawen@gmail.com

Dov Dori, Technion-Israel Institute Of Technology

Yehudit J. Dori, Technion-Israel Institute Of Technology

Using Laboratory Centered Analogies to Enhance Student Understanding of Chemical Concepts at the Molecular Level

Mitchell R. Bruce, University of Maine, mbruce@maine.edu

Shirly Avargil, University of Maine

Jonathan T. Shemwell, University of Maine

François G. Amar, University of Maine

Alice E. Bruce, University of Maine

Development and Validation of a Student's Competence Test for Upper Secondary Physics Education

Felix Schoppmeier, University Duisburg-Essen,

felix.schoppmeier@uni-due.de

Andreas Borowski, Aachen University

Hans E. Fischer, University Duisburg-Essen

Stemming the HIV/AIDS Tide: Linking Science Education to Critical World Issues

Gregory Vogt, Baylor College of Medicine, vogt@bcm.edu

Barbara Tharp, Baylor College of Medicine

Alana Newell, Baylor College of Medicine

James Denk, Baylor College of Medicine

Nancy Moreno, Baylor College of Medicine

Strand 11: Cultural, Social, and Gender Issues

Post-Secondary Minority Student Perception of STEM
Majors and Careers

10:15am-11:45am, Río Mar Salon 8

Presider:

Eileen C. Parsons, University of North Carolina at Chapel Hill

Evaluation of Students' First-Year Experience After a Summer Bridge Program Designed to Promote Diversity

Stanley M. Lo, Northwestern University, stanley-lo@northwestern.edu

Su Swarat, Northwestern University

Luke C. Flores, Northwestern University

Denise Drane, Northwestern University

Greg Light, Northwestern University

Science Majors and Non-Science Majors: Black College Students' Perceptions of Scientists

Crystall S. Gomillion, Eisenhower Middle School,

crystall_gomillion@hotmail.com

Eileen C. Parsons, University of North Carolina at Chapel Hill

Supporting Future Scientists: Predicting Minority Student Participation in the STEM Opportunity Structure in Higher Education

Sylvia Hurtado, UCLA, sylvia.hurtado@gmail.com

Tanya Figueroa, UCLA

Bryce E. Hughes, University of California, Los Angeles

Occupying the E in STEM and Science: Rethinking the New Engineering Focus

Matthew Weinstein, UW Tacoma Education Program,
mattheww@u.washington.edu
Karen Tonso, Wayne State University

Strand 12: Educational Technology

Teachers, TPACK and Using Technology to Support Instruction

10:15am-11:45am, Río Mar Salon 7

President:

Victoria Costa

Preservice Teachers' Tpack: Using Technology To Support Inquiry Instruction

Jennifer L. Maeng, University of Virginia, jlc7d@virginia.edu
Bridget K. Mulvey, Kent State University
Lara K. Smetana, Loyola University Chicago
Randy L. Bell, Oregon State University

Changes In Pre-Service Science Teachers' Self-Efficacy Toward Technological Pedagogical Content Knowledge (TPACK)

Sedef Canbazoglu Bilici, Aksaray University,
sedefcanbazoglu@gmail.com
Havva Yamak, Gazi University
Nusret Kavak, Gazi University
Selcen Guzey, University of Minnesota

Exploring the Use of ICT Tools and TPACK of Taiwanese Middle Science Teachers

Syh-Jong Jang, Chung-Yuan Christian University, jang@cycu.edu.tw
Meng-Fang Tsai, Chung-Yuan Christian University

An Exploratory Study of Science Teachers' Conceptions of the Nature of Technology

Noemi Waight, University at Buffalo, nwright@buffalo.edu

Strand 15: Policy

The Influence of Federal Policy on Science Teaching and Research

10:15am-11:45am, Río Mar Salon 10

President:

Jonathan F. Osborne

Challenges of Implementing the Next Generation Science Standards (NGSS) in Local-Control States

Jacob Foster, Massachusetts Department of Education,
jfoster@doe.mass.edu
Hannah Sevia, University of Massachusetts Boston
Allison Scheff, University of Massachusetts Boston

College Science and Mathematics Faculty's Responses to a Statewide Policy of Scholarship of Teaching and Learning

Abdulkadir Demir, Georgia State University, abdulcadir_d@yahoo.com
Lisa M. Martin-Hansen, Georgia State University
Chad Ellett, CDE Research
Mehmet Fatih Tasar, Gazi Universitesi

The Semantic Relationship Between Teachers Beliefs about Pedagogy and Policy

Todd L. Hutner, The University of Texas at Austin, thutner@gmail.com
Arthur B. Markman, The University of Texas at Austin

Investigating Publication Bias for Recent Causal Effects Studies in Science Education

Joseph A. Taylor, Biological Science Curriculum Study, jtaylor@bscs.org
Susan M. Kowalski, BSCS
Molly Stuhlsatz, BSCS
Christopher Wilson, BSCS

Conducting Studies of Causal Effects in Science Education: Considering Trade-Offs to Accommodate Methodological Requirements and the Policy Constraints Affecting Research in Schools

Janet Carlson, BSCS, jcarlson@bscs.org
Joseph A. Taylor, Biological Science Curriculum Study
Susan M. Kowalski, BSCS
Christopher Wilson, BSCS
Stephen Getty, BSCS

NARST Business Meeting

Box lunch provided for 1st 100 attendees who sign up.

12:00pm – 1:00pm, Caribbean Salon 3

Concurrent Session #5

1:15pm – 2:45pm

Strand 1: Science Learning, Understanding and Conceptual Change

Epistemic Aspects of Science Teaching and Learning
1:15pm-2:45pm, Río Mar Salon 1

President:

Fouad Abd-El-Khalick

Borrowing Structure from a Clearer Analogue to Overcome a Misconception About Boiling

Brandon R. Emig, North Carolina State University, bremig@ncsu.edu

The Impact of Explicit and Reflective NOS Instruction on Students' Epistemological Beliefs

Tiffany M. Roby, Drake University, tiffany.robby@drake.edu
Jerrid W. Kruse, Drake University
Jesse Wilcox, Iowa State University

High School Students' Argumentation of Energy Consumption Issues

Hui Jin, Ohio State University, hjin@ehe.osu.edu

Analyzing Epistemic Utility: How Students Evaluate and Coordinate Scientific Research Questions

Eric Berson, UC Berkeley, eberson@berkeley.edu

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Symposium - Controversy in an AP Biology Class: Looking Beyond Content Knowledge and Religiosity

1:15pm-2:45pm, Caribbean Salon 2

Presider:

Minjung Ryu, University of Maryland

Presenters:

Minjung Ryu, University of Maryland, mryu@umd.edu

Tiffanyrose Sikorski, University of Maryland, College Park

Jennifer Richards, University of Maryland, College Park

Lama Jaber, University Of Maryland, College Park

Janet Coffey, University of Maryland, College Park

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Science Learning within Chemistry Domains

1:15pm-2:45pm, Río Mar Salon 10

Presider:

Vashti Sawtelle

Conceptual Understanding of Chemical Reactions and Energy: An Investigation through Context-Based Approach

Ceyhan Cigdemoglu, Atilim University, ccigdemoglu@atilim.edu.tr

Omer Geban, Middle East Technical University

Investigating the Effects of Problem-orientation and Interconnectedness in Context-based Learning Tasks

Elke Sumfleth, University of Duisburg-Essen,

elke.sumfleth@uni-due.de

Andrea Harbach, University of Duisburg-Essen, Chemistry Education

Sabine Fechner, Leibniz University Hannover

Subject as Context Level in Biology and Chemistry Courses

Vanessa Pfeiffer, University of Duisburg Essen,

vanessa.pfeiffer@uni-due.de

Eva Kölbach, University of Duisburg-Essen

Elke Sumfleth, Universitaet Duisburg-Essen

Angela Sandmann, University Of Duisburg Essen

Evaluating Characteristics of Real-life Contexts for the Chemistry Classroom

Sabine Fechner, Leibniz University Hannover, fechner@idn.uni-hannover.de

Helena Van Vorst, University of Duisburg-Essen

Elke Sumfleth, University of Duisburg-Essen

Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies

Related Paper Set - Engaging Experienced and Preservice

K-6 Teachers In Scientific Practices of Argumentation and Explanation Building

1:15pm-2:45pm, Río Mar Salon 3

Presider:

Carla Zembal-Saul, Penn State University

Teachers' Beliefs and Practices Around Argumentation During a Curriculum Enactment

Katherine L. McNeill, Boston College, kmcneill@bc.edu

Maria Gonzalez-Howard, Boston College

Rebecca Katsh-Singer, Boston College

Jeremy F. Price, University of California Berkeley

Suzanna Loper, University of California Berkeley

Elementary Teachers' Uptake of Aspects of a Framework for Constructing Explanations in Science

Mark Merritt, Penn State University, mdm35@psu.edu

Carla Zembal-Saul, Penn State University

Alicia McDyre, Penn State University

Promoting Explanation-Based Reasoning Through Teacher Questioning Practices

Kari Shutt, University of Washington, shuttk@uw.edu

Nancy Vye, University of Washington

Pre-Service Teachers Arguing About Science Teaching Methods

Kathleen Crucet-Villavicencio, University of Wisconsin-Madison,

kathleen.crucet@gmail.com

Leema Berland, University of Wisconsin-Madison

A Discursive Model for Engaging Pre-Service Elementary Teachers with Teaching Science as Argument

Elisebeth Boyer, Penn State University, eboyer@psu.edu

Carla Zembal-Saul, Penn State University

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies

Assessing Students' Science Understandings

1:15pm-2:45pm, Pelican Room

Presider:

Huseyin Colak

Investigating the Development and Influence of Particle-Oriented and Two-Stage Teaching Module Via Conceptual Evolutionary Approach

Wen-Lung Wu, National Taiwan Normal University,
ntnu.wl.wu@gmail.com

Mei-Hung Chiu, National Taiwan Normal University

Hongming Liaw, National Taiwan Normal University

Understanding Korean High School Students' Conception of Climate Change Using Issue Concept-Map (IC-Map)

Jinhee Kim, Ewha Womans University, kkijeneb@hotmail.com

Kongju Mun, Ewha Womans University

Sung-Won Kim, Ewha Womans University

Joseph Krajcik, Michigan State University

Jiyoung Jang, Ewha Womans University

Hyo-Suk RYU, Ewha Womans University

A Comparative Study of the Development of Science Proficiency in High School Chemistry

Jonathon Grooms, The Florida State University, jgrooms@fsu.edu

Patrick J. Enderle, The Florida State University

Victor D. Sampson, Florida State University

Gender and Levels of Attainment of Scientific Literacy Among Students Under Constructivist Instructional Model

Apollonia A. Nwosu, University of Nigeria,

apoanaelenwosu@yahoo.com

Ebere Ibe, University of Nigeria

Why Do Students Struggle With the Idea of Conservation of Matter?

Ingrid M. Sanchez-Tapia, University of Michigan, ingridsa@umich.edu

Joseph S. Krajcik, Michigan State University

Namsu Shin, University of Michigan

Strand 5: College Science Teaching and Learning (Grades 13-20)

Focusing on Conceptual Understanding in College Science Teaching

1:15pm-2:45pm, Parrot Room

Presider:

Meghan Rector Federer, The Ohio State University

Demon Facilitated Understanding of Entropy: A Cognitive and Community Approach

Sissi L. Li, California State University Fullerton, sili@fullerton.edu

Michael E. Loverude, California State University Fullerton

Effects of Problem-Based Learning on Biology Students' Conceptual Understandings About Animal Physiology and Student Perceptions

Lin Xiang, University of Kentucky, lin.xiang@uky.edu

Jeffrey L. Osborn, University of Kentucky

Jana L. Bouwma-Gearhart, University of Kentucky

Do We Emphasize Too Much on Conceptual Understanding Over Algorithmic Problem Solving in Introductory Physics, or Vice Versa?

Shin Young Lee, Ewha Womans University, 1017lee@hanmail.net

Jung Sook Yoo, Ewha Womans University

Kevin Insik Hahn, Ewha Womans University

Moving Students to a Better Understanding of Enzyme Specificity

Mounir R. Saleh, The University of Southern Mississippi,

mounir.saleh@eagles.usm.edu

Kristy Halverson, University of Southern Mississippi

Brian Gearity, University of Southern Mississippi

Strand 6: Science Learning in Informal Contexts

The Value of Connecting Informal and Formal Educational Systems

1:15pm-2:45pm, Sea Gull Room

Presider:

Amy Cox-Petersen

Characterizing the UK Science Education Community

Matthew C. Wenger, Oregon State University, mwenger1701@gmail.com

John H. Falk, Oregon State University

Jonathan F. Osborne, Stanford University

Lynn D. Dierking, Oregon State University

Emily Dawson, King's College London

Billy Wong, King's College London

A Comparative Study of the Normative Scientific Practices in Herpetological Summer Programs for Children

Catherine M. Scott, Coastal Carolina University, cmkowole@uncg.edu

How to Support Students to Apply Knowledge Learned in the Classroom to a Field Setting

Kari Beate Remmen, University of Oslo,

k.b.remmen@naturfagsenteret.no

Merethe Froyland, University of Oslo

Strand 7: Pre-service Science Teacher Education

Learning to Create Culturally-Responsive Science Classrooms

1:15pm-2:45pm, Canary Room

President:

Sara E. Tolbert

How Do I Make it Relevant? Preservice Science Teachers Contextualizing Instruction in Underserved Classrooms

Sara E. Tolbert, University of Arizona, saratolbert@email.arizona.edu

Learning to Teach Elementary Science in an Experiential, Informal Context: Culture, Learning and Identity

Carolyn S. Wallace, Indiana State University, carolyn.wallace@indstate.edu

Reflecting on Contrasts: Productive Reflection by Pre-Service Teachers Inspired by Multiple Field Placements

Daniel K. Capps, University of Maine, daniel.capps@maine.edu
Shirly Avargil, University of Maine
Jonathan Shemwell, University of Maine
Tao Mason, Yale University
MacKenzie R. Stetzer, University of Maine
Michelle K. Smith, University of Maine

Can We Prepare Teachers for Culturally Responsive Teaching Without Protracted Field Experiences in High-Need Settings?

Kevin Goff, College of William & Mary, kdgoff@email.wm.edu
Juanita J. Matkins, College of William & Mary
Jacqueline T. McDonnough, Virginia Commonwealth University

Strand 7: Pre-service Science Teacher Education

Methods to Improve Preservice Teachers' Practices

1:15pm-2:45pm, Río Mar Salon 9

President:

Stacey Britton

Developing Practical Wisdom for Teaching Science in Initial Teacher Preparation: Adopting Electronic Portfolios

Karen Goodnough, Memorial University, kareng@mun.ca

Helping Pre-Service Elementary Teachers Enact Strong Lesson Planning Practices

Jennifer L. Cartier, University of Pittsburgh, jcartier@pitt.edu
Elaine M. Lucas-Evans, University of Pittsburgh
Danielle Ross, University of Pittsburgh
Ellice A. Forman, University of Pittsburgh

Strand 8: In-service Science Teacher Education

What Should Mentoring Look Like during the Induction Years?

1:15pm-2:45pm, Río Mar Salon 4

President:

Samina Naseem, Michigan State University

Personas of Novice Science Teacher Mentors

Samina Naseem, Michigan State University, naseemsa@msu.edu

Opportunities for Change: The Noticings and Self Reflections of a Cooperating Secondary Science Teacher

Shelly R. Rodriguez, University of Texas, shelly.rodriguez@austin.utexas.edu
James P. Barufaldi, The University of Texas at Austin

Teachers' Experiences in Professional Development: A Comparison of Face-To-Face, Online, and Hybrid Delivery Models

Ya-Wen Cheng, University of Missouri, yck86@mizzou.edu
Deborah L. Hanuscin, University of Missouri-Columbia
Mark J. Volkmann, University of Missouri

On the Nature of Induction: Case Studies of Four Beginning Secondary Science Teachers' Induction Experiences

Angela W. Webb, Louisiana State University, awwebb@lsu.edu

Strand 9: Reflective Practice

Related Paper Set - Affordances and Limitations of Video Clubs in Promoting Science Teacher Thinking, Learning, and Practice

1:15pm-2:45pm, Heron Room

Developing Preservice Teachers' Knowledge for Teaching through Video Clubs

Heather J. Johnson, Vanderbilt University, heather.j.johnson@vanderbilt.edu
Michelle Cotterman, Vanderbilt University

Video Clubs as Productive Sites for Preservice Science Teachers to Interrogate Instructional Representations

Michelle Cotterman, Vanderbilt University, michelle.e.cotterman@vanderbilt.edu
Heather J. Johnson, Vanderbilt University

Promises and Limitations of Video Clubs for Supporting Ambitious Science Teaching

Melissa Braaten, University of Wisconsin, mbraaten@wisc.edu

Supporting Teachers' Ability to Attend to Student Thinking in Science

Melissa J. Luna, West Virginia University, melissa.luna@mail.wvu.edu
Miriam Sherin, Northwestern University

Strand 10: Curriculum, Evaluation, and Assessment Symposium - Understanding Inquiry Classroom Practice through Measurement of Teacher Inquiry Skills

1:15pm-2:45pm, El Morro 1 & 2

Presider:

Jon E. Pedersen, University of Nebraska-Lincoln

Presenters:

Gwen Nugent, University of Nebraska, gnugent@unl.edu
Jon E. Pedersen, University of Nebraska-Lincoln
Jeff C. Marshall, Clemson University
Daphne D. Minner, Abt Associates
Jacqueline DeLisi, Education Development Center, Inc
Gina Kunz, University of Nebraska

Strand 10: Curriculum, Evaluation, and Assessment Models and Applications of Research and Evaluation on Student and Teacher Outcomes

1:15pm-2:45pm, Río Mar Salon 2

Presider:

Stephanie Sisk-Hilton, San Francisco State University

Improving Learning by Improving Classroom Assessment in Earth Science: Findings from the Contingent Pedagogies Project

William R. Penuel, University of Colorado Boulder, william.penuel@colorado.edu
Angela H. DeBarger, SRI International
Savitha Moorthy, SRI International
Yves Beauvineau, Denver Public Schools
Kate Allison, University of Colorado Boulder

Formative Assessment to Improve Student Learning in High School Chemistry

Angela H. DeBarger, SRI International, angela.haydel@sri.com
Carlos Ayala, Sonoma State University
Jim E. Minstrell, FACET Innovations
Rachel Freed, Sonoma State University
Sara Vasquez, SRI International

Evaluating Student Understanding in Virtual Environment-Based Science Assessments: Comparative Measures for Content Knowledge and Inquiry

Angela Shelton, North Carolina State University, anshelto@ncsu.edu
Uma Natarajan, Temple University
Diane Jass Ketelhut, University of Maryland
Deb Felix, University of Maryland
Chris Teufel

The Use of Outcome Mapping in the Educational Context

Anna R. Lewis, University of South Florida, arlewis@usf.edu

Strand 10: Curriculum, Evaluation, and Assessment Related Paper Set - Developing and Evaluating an Eighth Grade Curriculum Unit that Links Foundational Chemistry to Biological Growth

1:15pm-2:45pm, San Cristobal

Selecting Core Ideas and Practices -- An Iterative Process

Jo Ellen Roseman, AAAS Project 2061, jroseman@aaas.org
Cari F. Herrmann Abell, AAAS Project 2061
Jean C. Flanagan, AAAS Project 2061
Rebecca Kruse, BSCS
Elaine V. Howes, BSCS
Janet Carlson, BSCS
Kathleen Roth, BSCS
Brooke Bourdelat-Parks, BSCS

Changing the Research-Based Curriculum

Elaine V. Howes, BSCS, ehoves@bscs.org
Rebecca Kruse, BSCS
Janet Carlson, BSCS
Kathleen Roth, BSCS
Brooke Bourdelat-Parks, BSCS
Jo Ellen Roseman, AAAS Project 2061
Cari F. Herrmann Abell, AAAS Project 2061
Jean C. Flanagan, AAAS Project 2061

Designing Professional Development To Support Teaching

Rebecca Kruse, BSCS, rkruse@bscs.org
Elaine V. Howes, BSCS
Janet Carlson, BSCS
Kathleen Roth, BSCS
Brooke Bourdelat-Parks, BSCS

Using Student Measures to Evaluate the Promise of the Intervention

Cari F. Herrmann Abell, AAAS Project 2061, cabell@aaas.org
Jean C. Flanagan, AAAS Project 2061
Jo Ellen Roseman, AAAS Project 2061

Using Teacher Measures to Evaluate the Promise of the Intervention

Jean C. Flanagan, AAAS Project 2061, jflanaga@aaas.org
Cari F. Herrmann Abell, AAAS Project 2061
Jo Ellen Roseman, AAAS Project 2061

Strand 11: Cultural, Social, and Gender Issues

Teacher Development: Attitudes, Perceptions, and Critical Pedagogy

1:15pm-2:45pm, Río Mar Salon 8

Presider:

Gale Seiler, McGill University

Talking With Jesus about Darwin: Religion, Conceptual Vocabulary, and the Training of American Science Teachers

David E. Long, George Mason University, davidelong74@gmail.com
Leslie S. Jones, Valdosta State University

Critical Pedagogy in the Pre-Service Teacher

Curriculum, Teaching English Language Learners

Jessica R. Stephenson, Virginia Tech, jesteph3@vt.edu
George E. Glasson, Virginia Tech
Gresilda K. Tilley-Lubbs, Virginia Tech
Mythianne Shelton, Virginia Tech

Working with Inservice Science Teachers to Develop CPD: An Emergent, Responsive Approach to Teacher Professional Development

Christina Siry, University of Luxembourg, christina.siry@uni.lu
Sara Wilmes, University of Luxembourg
Andrea Teuchert, University of Luxembourg

Pre-Service Teachers' Views about Teaching and Learning of Science by ELLs: A Case Study

Grace N. Orado, Syracuse University, gnorado@syr.edu
Jeffrey J. Rozelle, Syracuse University

Strand 12: Educational Technology

Symposium - Technology-Enhanced Assessment: Implications for Science Education Policy

1:15pm-2:45pm, Caribbean Salon 1

Presider:

Philip Bell, University of Washington

Presenters:

Nancy B. Songer, The University of Michigan
Edys S. Quellmalz, WestEd
Kihyun (Kelly) Ryoo, University of North Carolina
Douglas B. Clark, Vanderbilt University
Ji Shen, University of Georgia
Marcia C. Linn, University of California-Berkeley

Strand 12: Educational Technology

Assessment and Technology Rich Environments

1:15pm-2:45pm, Río Mar Salon 7

Presider:

Kevin J. White

Multi-Level Assessment of Science Learning in the Context of a Game-Based Curriculum

Parker Stuart, University of Missouri, pes4kc@mail.missouri.edu
Troy Sadler, University of Missouri
William L. Romine, University of Missouri
Dominike Merle-Johnson, University of Missouri - Columbia

Using Student-Generated Animations to Assess Student Understanding of the Particulate Nature of Matter

Jennifer L. Albert, NC State University, jennifer_albert@ncsu.edu
Margaret R. Blanchard, North Carolina State University
Eric N. Wiebe, North Carolina State University

Exploring the Efficacy of Machine Learning and Translation Software in International Comparison Studies

Minsu Ha, The Ohio State University, ha.101@osu.edu
Ross H. Nehm, The Ohio State University

Using Blended Combinations of Physical and Virtual Manipulatives to Enhance Sixth-Graders Conceptual Understanding in Physics

Marios Michael, University of Cyprus, michaelm83@gmail.com
Zacharias C. Zacharia, University of Cyprus
Georgios Olympiou, University of Cyprus
Vasoula Papasozomenou, Acropolis Lyceum

Break

2:45pm – 3:15pm, Río Mar Ballroom Foyer

Concurrent Session #6

All strand poster sessions.

3:15pm – 5:15pm

Poster Session A

3:15pm – 4:15pm, Río Mar Ballroom 5

Strand 1: Science Learning, Understanding and Conceptual Change

Poster Session A

3:15pm – 4:15pm, Río Mar Ballroom 5

A1. Students' Framing of Digital Gaming Environments Designed to Teach Newtonian Mechanics

James M. Hughes, Vanderbilt University, jamesh53@gmail.com
Douglas B. Clark, Vanderbilt University

A3. Reasoning about Mechanism: Children's Explanations of Pop-ups

Mayumi Shinohara, Vanderbilt University,
mayumi.shinohara@vanderbilt.edu
Rob Rouse, Vanderbilt University
Rich Lehrer, Vanderbilt University

A5. Pathways of Learning Illuminated from 8th Grade Students' Mental Models of Magnetism

David Sederberg, Purdue University, dsederbe@purdue.edu
Lynn A. Bryan, Purdue University

A7. Supporting Chemistry Learners: Using Visual Scaffolds to Foster Comprehension in an Interactive Simulation

Ruth N. Schwartz, New York University, rns221@ynu.edu
Jan L. Plass, New York University
Bruce D. Homer, CUNY Graduate Center
Catherine E. Milne, New York University
Trace Jordan, New York University
Steven Yavner, New York University

A9. Research and Scientific Literacy: How does What you do Contribute to What you Understand?

Gail Richmond, Michigan State University, gailr@msu.edu

A11. Explore the Visual-Spatial Abilities in Identifying 3D Chemical Structures

Chin-Fei Huang, National Kaohsiung Normal University,
chinf1027@yahoo.com.tw
ChengHsieh Yu, National Kaohsiung Normal University
Houn-Lin Chiu, National Kaohsiung Normal University
Chia-Ju Liu, National Kaohsiung Normal University

A13. Development of a Learning Progression for the Formation of the Solar System

Julia Plummer, Pennsylvania State University, jdp17@psu.edu
Alice Flarend, Pennsylvania State University
Christopher Palma, Pennsylvania State University
KeriAnn Rubin, Pennsylvania State University
Brandon Botzer, Pennsylvania State University

A15. On The Relationship between Physical Computation and Development of Mechanistic Reasoning In Physics & Ecology

Gokul Krishnan, Vanderbilt University, gokul.krishnan@vanderbilt.edu
Pratim Sengupta, Vanderbilt University

A17. Students' Energy Concepts in Biological Contexts – Towards a Holistic Energy Learning Progression

Sebastian T. Opitz, Leibniz Institute (IPN) Kiel / Germany,
opitz@ipn.uni-kiel.de
Ute Harms, Leibniz Institute (IPN) Kiel / Germany
Knut Neumann, Leibniz Institute (IPN) Kiel / Germany

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Poster Session A

3:15pm – 4:15pm, Río Mar Ballroom 5

A19. Exploring the Usefulness of Science in Daily Life

John Ruppert, jruppert@saintpeters.edu
Margaret A. Holzer, Rutgers University GSE
Nicole Shea, Rutgers University
Peter Cannon, Saint Peter's College

A21. Haptic Worlds: New Learning Environments for Teaching Students with Visual Impairments about Particulate Motion

Gina Childers, North Carolina State University,
childers.gina@gmail.com
Gail M. Jones, North Carolina State University
Brandon Emig, North Carolina State University
Vanessa Stevens, North Carolina State University
Joel Chevrier
Hong Tan
Jonathan List, North Carolina State University

A23. Characterizing Teacher Effect on Student Progress Along a Learning Progression

Deborah C. Peek-Brown, University of Michigan,
dpbrown@umich.edu
Shawn Stevens, University Of Michigan
Sung-Youn Choi, Michigan State University
Ingrid Sánchez, University of Michigan
Namsoo Shin, University of Michigan
Joseph S. Krajcik, Michigan State University

A25. Exploring an Approach to Raising Students' Intrinsic Motivation in Learning Chemistry

Katrin Vaino, University of Tartu, katrin.vaino@ut.ee
 Miia Rannikmäe, University of Tartu
 Jack Holbrook, University of Tartu

A27. The Effect of an Argument-Based Inquiry Approach on Students' Critical Thinking Skills: A Two-year Study

Jeong-Yoon Jang, University of Iowa, jeongyoon-jang@uiowa.edu
 Brian M. Hand, University of Iowa
 Kyong Mi Choi, University of Iowa

A29. Seeing Difference across Time and Space: Implications of Ecological Spatiotemporal Variation for Students' Field Practice

Michelle Cotterman, Vanderbilt University, michelle.e.cotterman@vanderbilt.edu
 Richard Lehrer, Vanderbilt University
 Leona Schauble, Vanderbilt University/Peabody College

A31. The Impact of Resident Scientist Graduate Students on Middle School Teaching and Learning

Mika Munakata, Montclair State University, munakatam@mail.montclair.edu
 Sumi Hagiwara, Montclair State University

A33. Co-construction of Knowledge in a Modeling-based Teaching Context

Rosaria Justi, Univ Federal de Minas Gerais, Brazil, rosariajusti@gmail.com
 Paula P. Costa, Univ Federal de Minas Gerais, Brazil

Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies

Poster Session A

3:15pm – 4:15pm, Río Mar Ballroom 5

A35. School Leadership and Science Education: A Case Study of how a Preschool Principal Frames and Promotes Teaching and Learning in Preschool Science Education

Loucas T. Louca, European University-Cyprus, Louca.L@cytanet.com.cy
 Anna Papaloizou, European University-Cyprus

A37. Capturing the Dialectical Aspect of a Classroom SSI Discussion: An Expanded Analytic Scheme

Chrystalla Lymbouridou, Ministry of Education & Culture, Cyprus, L.Louca@euc.ac.cy
 Loucas T. Louca, European University-Cyprus

A39. Challenges and Support: Dynamic Relationships between Inquiry and Literacy in Elementary Science Education

Marianne Odegaard, University Of Oslo, marianne.odegaard@naturfagsenteret.no
 Sonja M. Mork, University of Oslo
 Berit S. Haug, University of Oslo
 Gard Ove Sorvik, University of Oslo
 Jonathan Francis Osborne, Stanford University

A41. Understanding Immersive Argument-Based Inquiry: A Critical Review of Thesis Studies on the Science Writing Heuristic Approach

Jee Kyung Suh, University of Iowa, jeekyung-suh@uiowa.edu
 Ying-Chih Chen, University of Minnesota
 Brian M. Hand, University of Iowa

A43. Thinking Like a Butterfly: Leveraging Students' Embodied Intuitions in Elementary Ecology Classrooms

Amanda C. Dickes, Vanderbilt University, amanda.c.dickes@vanderbilt.edu
 Pratim Sengupta, Vanderbilt University
 Gokul Krishnan, Vanderbilt University
 Kara Krinks, Vanderbilt University
 Amy V. Farris, Vanderbilt University

A45. Elementary Teachers' Use of Science Curriculum Materials to Foster Explanation Construction

Laura Zangori, University of Iowa, laura-zangori@uiowa.edu
 Cory T. Forbes, University of Iowa
 Mandy Biggers, University of Iowa

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies

Poster Session A

3:15pm – 4:15pm, Río Mar Ballroom 5

A47. Arguing for the Sake of Argument: STEM Career Changers' Experience and Beliefs Regarding Key Practices of Science

Carrie-Anne Sherwood, University of Michigan, cashier@umich.edu

A49. Deep Conceptual Learning in Science and Mathematics: Perspectives of Educators and Educational Administrators

Peter Rillero, Arizona State University, rillero@asu.edu

A51. Designing an Instructional Model for Promoting Scientific Argumentation: Exploring the Effectiveness

Suna Ryu, UC Berkeley, sunaryu@ucla.edu
 Yuhwa Han, Korea National University of Education
 Seoung-Hey Paik, Korean National University of Education

A53. Exploring Strategy for Improving Nigerian Students' Performance in Quantitative Electrolysis in Chemistry

Adewale Adelayi, Lagos State University, Nigeria, walelayi@yahoo.com
 Bolatito Danmole, Lagos State University, Nigeria
 Peter A. Okebukola, Lagos State University, Nigeria

A55. Feeding the World: Writing about Socio-Scientific Issues in 7th Grade to Increase Decision-Making Skills

Meena M. Balgopal, Colorado State University,
 Meena.Balgopal@colostate.edu
 Lynn Gilbert, Conrad Ball Middle School

A57. Teachers' Pedagogical Design Capacity and Use of Educative Curriculum Materials when Implementing a Biophysics Curriculum

Morgan L. Presley, University of Missouri, mlp446@mail.missouri.edu
 Parker E. Stuart, University of Missouri-Columbia
 Nilay Muslu, University of Missouri, Columbia
 Deborah L. Hanuscin, University of Missouri-Columbia

A59. Pedagogical Content Knowledge and the Gas Laws: A Multiple Case Study

James M. Nyachwaya, North Dakota State University, James.Nyachwaya@nds.edu
 Gillian H. Roehrig, University of Minnesota
 Mary E. Sande, University of Minnesota

A61. Impact of Administrative Support on K-12 Science Teachers' Job Satisfaction in Texas: Structural Equation Modeling

Muhammet Mustafa Alpaslan, Texas A&M University,
 alpaslan27@tamu.edu
 Carol L. Stuessy, Texas A&M University

Strand 5: College Science Teaching and Learning (Grades 13-20)

Poster Session A

3:15pm – 4:15pm, Río Mar Ballroom 5

A63. Korean Female Undergraduate Students' Evaluation about Trustworthiness of Scientific Information

Jiyeong Mun, Ewha Womans University, jiyeong86@gmail.com
 Eunjin Kim, Ewha Womans University
 Kongju Mun, Ewha Womans University
 Hyo-Suk Ryu, Ewha Womans University
 Sung-Won Kim, Ewha Womans University

A65. Evolutionary Theory as an Advance Organizer in Introductory Biology

Lawrence C. Scharmann, Florida State University, lscharmann@fsu.edu
 Wilbert Butler, Tallahassee Community College
 Miray Varol, Florida State University

A67. Beyond Content Knowledge: Improving Postsecondary Learners' Metacognition, Felt Competencies and Affect Towards Inquiry Through Inquiry

Jana L. Bouwma-Gearhart, Oregon State University, jlbo226@uky.edu
 Sarah J. Adumat, UW-Madison
 Rebecca McNall Krall, University of Kentucky
 Andrew Bouwma-Gearhart, Oregon State University
 Lin Xiang, University of Kentucky
 Allyson Rogan-Klyve, Oregon State University

A69. Investigating Students' Understanding of Material Science Concepts by Reflecting on Confusing Points

Muhsin Menekse, University of Pittsburgh, muhsin@asu.edu
 Michelene T. H. Chi, Arizona State University
 Stephen Krause, Arizona State University

A71. A Hands-on Activity Incorporating the Three Levels of Representation and Its Impact in Students' Understanding about Redox Concepts

Zuleika Medina, University of Puerto Rico at Cayey,
 zuleika.medina1@upr.edu
 Jose Noel Caraballo, University of Puerto Rico at Cayey
 Edgardo L. Ortiz Nieves, University of Puerto Rico at Cayey
 Joshua I. Rosario-Sepúlveda, University of Puerto Rico at Cayey

A73. Problem-based Learning in the College Physics Classroom: Did They "Get It" or Not?

Catherine M. Koehler, Southern Connecticut State University,
 sissianne@aol.com
 Attila Elteto, University of New Haven

A75. The Impact of Project-Based Group Work on Engineering College Students' Content Knowledge and Affect

Anne Marie A. Casper, Colorado State University,
 aramaticasper@gmail.com
 Meena M. Balgopal, Colorado State University
 Karen Rambo-Hernandez, Colorado State University
 Rebecca Atadero, Colorado State University
 Darrell Fontane, Colorado State University

A77. Service Learning as a Strategy for Learning Basic Genetics Concepts

Michelle L. Klosterman, University of Missouri,
 klostermanml@missouri.edu
 Gloria Muday, Wake Forest University
 Carole Browne, Wake Forest University
 Stacey Lundy, Wake Forest University

Strand 6: Science Learning in Informal Contexts

Poster Session A

3:15pm – 4:15pm, Río Mar Ballroom 5

A79. Informal Science Learning Experiences: Possible Contributions to Science Identity

Katrina Roseler, Florida State University, kr09e@my.fsu.edu

A81. Sharing Stories: Identity-Related Visitor Narratives from Body Worlds

Michelle M. Dubek, OISE/University of Toronto,
michelle.dubek@uoit.ca

Susan Jagger, OISE/University of Toronto

Erminia G. Pedretti, University Of Toronto

A83. Examining Zoo Education and Visitor Interaction for Significant Knowledge Gains

Patrick Dawes, Syracuse University, pjdawes@syr.edu

A85. Archaeology as a Means of Engaging Underserved Youth in STEM: Lessons from a Field School

Camellia Sanford, Rockman et al, camellia@rockman.com

A87. Be a Scientist! Scaling Up a Hands-On Family Science Engineering Program

Tara Chklovski, Iridescent, Founder & CEO,

tara@iridescentlearning.org

Harouna Ba, Education Development Center's Center for Children and Technology

Strand 7: Pre-service Science Teacher Education

Poster Session A

3:15pm – 4:15pm, Río Mar Ballroom 5

A89. A Discursive Approach of Analyzing Preservice Teachers' Discourse on Becoming a Science Teacher

Pei-Ling Hsu, University of Texas at El Paso

Tania Moreno, University of Texas at El Paso

A91. Learning to Teach Science: The Experience of a Preservice Teacher in a High Needs School

Karen Rose, Florida State University, kr04@fsu.edu

A93. Preparing Pre-Service Teachers to Teach Science to English Language Learners: Preliminary Analyses of Impact on Student Learning

Jerome M. Shaw, University of California - Santa Cruz,
jmlshaw@ucsc.edu

Edward G. Lyon, Arizona State University

Preetha K. Menon, UC Santa Cruz

Trish Stoddart, University of California - Santa Cruz

A95. Analysing Diagnostic Competencies of Pre-service Teachers by means of the Simulated Science Classroom

Claus Bolte, Freie Universitaet Berlin - Germany,
claus.bolte@fu-berlin.de

Jens Moeller, Christian Albrechts University Kiel - Germany

Anna Suedkamp, University of Bamberg - Germany

A97. Preparing Digital STEM Teachers and Teacher Educators

Victoria Costa, California State University Fullerton,
vcosta@fullerton.edu

Kristen Shand, California State University, Fullerton

Debra DeCastro-Ambrosetti, California State University, Fullerton

Natalie Tran, California State University, Fullerton

A99. Noyce Pathway to Science Scholars: Attracting and Training Future Science Teachers

Phillip Feldman, University of South Alabama,

pfeldman@southalabama.edu

Andre M. Green, University Of South Alabama

A101. Instrument Development for Measuring the Professional Dispositions of Pre-service Math and Science Teachers

Tonya D. Jeffery, University of Houston, tdjeffery@uh.edu

A103. Pre-service Teachers' Developing Understanding of Teaching and Learning across Formal and Informal Learning Contexts

Maritza Macdonald, American Museum of Natural History,
mmacdonald@amnh.org

Alix Cotumaccio, American Museum of Natural History

Preeti Gupta, American Museum of Natural History

A105. Embedding Science Education Service Learning into a Preservice MAT Science Teacher Program: Candidates' Reflections

Lisa A. Borgeading, Kent State University, ldonnell@kent.edu

Joanne Caniglia, Kent State University

A107. Preservice Teachers' Understanding of an Argument-based Inquiry

Aeran Choi, Ewha Womans University, aeran-choi@hotmail.com

Eulsun Seung, Indiana State University

Strand 8: In-service Science Teacher Education

Poster Session A

3:15pm – 4:15pm, Río Mar Ballroom 5

A109. Examining Science Teacher Self-efficacy, Beliefs about NOS, and Constructivist Practice in a Collaborative Graduate Program

Ann M.L. Cavallo, University of Texas At Arlington, cavallo@uta.edu

Gregory Hale, The University of Texas at Arlington

Kevin J. White, University of Texas at Arlington

A111. Middle School Science and Mathematics Teachers' Knowledge of the Nature of Science

Sissy S. Wong, University of Houston, sissywong@uh.edu

A113. Supporting Elementary Teachers' Learning to Use Formative Assessment for Science: The RAES-Iowa Professional Development Model

Cory T. Forbes, University of Iowa, cory-forbes@uiowa.edu

Kathy J. Long, University of California

Cathleen A. Kennedy, KAC Group

Jeanne Bancroft, Creative Connections, LLC

Christopher Soldat, Grant Wood Area Education Agency, Iowa

Mandy Biggers, University of Iowa

Jaime Sabel, University of Iowa

A115. Mentoring, Reflection and Growth in Science and Mathematics Teachers Using Plus/Delta

Sheryl McGlamery, University of Nebraska at Omaha,

sherylmcglamery@gmail.com

Saundra L. Shillingstad, University of Nebraska at Omaha

A117. Finding Time to Lead: High School Science Department Chairs as Instructional Leaders

Jeremy S. Peacock, University of Georgia and Monroe Area High School, peacock.jeremy@gmail.com

A119. Elementary Education Pre-service Teachers' Performance on Context-based Science Process Skills

Frackson Mumba, Southern Illinois University, frackson@siu.edu

Erin Miles, Southern Illinois University

Vivien M. Chabalengula, Southern Illinois University Carbondale

A121. Establishing an Effective Programme for Developing Teachers' Self-Efficacy towards Motivational Inquiry-based Teaching

Ana Valdmann, University of Tartu, anavaldmann@gmail.com

A123. Supporting the Supporters: A Case Study of Professional Development for Science Coordinators

Brooke A. Whitworth, University of Virginia, baw3tj@virginia.edu

Jennifer Maeng, University Of Virginia

Randy L. Bell, Oregon State University

Amanda L. Goncz, University of Virginia

A125. Understanding and Scaffolding Inquiry: A Tale of Three Teachers

Brooke A. Whitworth, University of Virginia, baw3tj@virginia.edu

Lindsay B. Wheeler, University of Virginia

Jennifer L. Maeng, University of Virginia

Randy L. Bell, Oregon State University

A127. Taking the First Step: Understanding Teacher Perspectives of Inquiry-Based Professional Development in a University-School Partnership

Krista E. Wood, University of Cincinnati, Krista.Wood@uc.edu

Kathie Maynard, University of Cincinnati

A129. Teachers' Beliefs of Technology Use to Teach Genetics

Regina Wragg, University Of South Carolina, rewragg@gmail.com

Christine R. Lotter, University of South Carolina

A131. Understanding Indian Teachers' Orientations in Relation to PCK and Curriculum Reform

Vanashri Nargund-Joshi, University at Buffalo, SUNY,

vanashri@buffalo.edu

Meredith A. Park Rogers, Indiana University

Strand 9: Reflective Practice

Poster Session A

3:15pm – 4:15pm, Río Mar Ballroom 5

A133. Leveraging Argumentation to Facilitate SMK Understanding among Students of A Middle School in China

Jianlan Wang, Indiana University, hurricane355wjl@gmail.com

A135. Patterns of Reflection on Practice Through Professional Development with High School Science Teachers

Nonyelum M. Alozie, Albion College, nonye.alozie@gmail.com

A137. Supporting Reflection on Co-teaching Practices that can Improve Science Teaching in Linguistically Diverse Classrooms

Sonya N. Martin, Seoul National University, sm655@snu.ac.kr

Jennifer C. Park, Seoul National University

A139. Pre-service Science Teachers' Implementation of Assessment for Students' Learning and their Beliefs

Hye-Eun Chu, Nanyang Technological University,

hyeeun.chu@gmail.com

A141. Reflective Teaching of Pedagogical Inquiry Strategies for Scientifically Literate Citizens

Jeremy A. Ervin, Richard Stockton College of NJ, ervinj@stockton.edu

A143. Transformative Learning and Science Education: Preparing University Students for Taking Action

Lyn Carter, Australian Catholic University, lyn.carter@acu.edu.au

Carolina Castano, Australian Catholic University

Mellita Jones, Australian Catholic University

Strand 10: Curriculum, Evaluation, and Assessment

Poster Session A

3:15pm – 4:15pm, Río Mar Ballroom 5

A145. Evaluating Engineering Standards, Perceptions, and Skills

Senay Purzer, Purdue University, spurzer@purdue.edu
 Tamara J. Moore, University of Minnesota
 Kristina M. Tank, University of Minnesota
 Aran W. Glancy, University of Minnesota
 Jennifer Kersten, Richfield High School/University of Minnesota
 Cathy Lachapelle, Museum of Science, Boston
 Jonathan Hertel, Museum of Science, Boston
 Preeya Phadnis, Museum of Science, Boston
 Christine M. Cunningham, Museum of Science, Boston
 Patrick McCrum, Purdue University

A149. Investigating Variations of Inquiry in Elementary Science Classrooms: Establishing Validity/Reliability of a Modified Observation Protocol

Mandy Biggers, University of Iowa, mandy-biggers@uiowa.edu
 Cory T. Forbes, University of Iowa
 Laura Zangori, University of Iowa College Of Education

A151. Differentiating language skills, reading ability, and scientific knowledge with the Scientific Terminology Assessment Instrument (STAI)

Hendrik Haertig, IPN - Leibniz-Institut, haertig@ipn.uni-kiel.de

A153. Engagement and the Middle School Science Curriculum

Jeremy F. Price, University of California - Berkeley, jeremy.price@berkeley.edu
 Jacqueline Barber, University of California - Berkeley
 Seth Corrigan, University of California - Berkeley
 Jennifer Tilson, University of California - Berkeley
 Alison Billman, University of California - Berkeley
 Suzy Loper, University of California - Berkeley

A155. Developing Computer Model-Based Formative Assessments for High School Chemistry

Xiufeng Liu, University at Buffalo - SUNY, xliu5@buffalo.edu
 Noemi Waight, University at Buffalo - SUNY
 Erica L. Smith, University at Buffalo - SUNY

A157. Preliminary Results from Gymnasium Student's Perceived Competence, Determined through Self-Assessment against Components of Scientific Literacy

Regina Soobard, University of Tartu, regina.soobard@ut.ee
 Miia Rannikmae, University of Tartu

A159. Rubric for Judging Quality of Scientific Reasoning

Ava Zeineddin, Wayne State University, eb8533@wayne.edu

A161. Optimizing Machine-Learning Models for Automated Computer Scoring of Natural Selection Concepts

Minsu Ha, The Ohio State University, ha.101@osu.edu
 Simon Dennis, The Ohio State University
 Ross H. Nehm, The Ohio State University

A163. Assessing Young Students' Abilities in Science

Lena Löfgren, Kristianstad University, lena.lofgren@hkr.se
 Britt Lindahl, Kristianstad University

A165. Developing Interdisciplinary Science Curricula that Foster Energy Literacy for Undergraduate Student

Shannon Sung, University of Georgia, Shasung@uga.edu
 Ji Shen, University of Georgia

A167. Examining the Mastery of Science Skills using the 4th Grade Science TIMSS

Young-Sun Lee, Teachers College, Columbia University, yslee@tc.columbia.edu
 Yoon Soo Park, University of Illinois at Chicago
 Youngjin Song, University of Northern Colorado

A169. A Psychometric Look on Writing and Evaluating Arguments

Maria Evagorou, University of Nicosia, evagorou.m@unic.ac.cy
 Elena Papanastasiou, University of Nicosia

Strand 11: Cultural, Social, and Gender Issues

Poster Session A

3:15pm – 4:15pm, Río Mar Ballroom 5

A171. The Science of Broadening Participation: An Opportunity for the NARST Equity and Ethics Community

Eileen Carlton Parsons, University of North Carolina at Chapel Hill, rparsons@email.unc.edu

A173. Building a Collaborative Community to Recruit and Retain Underrepresented Preservice Elementary Teachers of Science

Michelle A. Fleming, Wright State University, mabfleming@gmail.com
 Reynee Kachur, University of Wisconsin Oshkosh
 Bhaskar Upadhyay, University of Minnesota
 Oliver Schinkten, Oshkosh Area School District Oshkosh, Wisconsin

A175. Middle-School Science Curriculum in Chile and Pakistan: Addressing Issues of Equity and Social Justice

Dante Cisterna, Michigan State University, cisterna@msu.edu
 Samina Naseem, Michigan State University

A177. The (Im?)Possible DREAM: Undocumented Latin@s' Testimonios on Crossing the Borderlands of High School Science

Jean Rockford Aguilar-Valdez, University of North Carolina, Greensboro, msrockford@gmail.com

A179. What is Good Science Teaching? Challenges in Teaching Science to Urban ELL Middle School Students

Kathryn Scantlebury, University of Delaware, kscantle@udel.edu
 Beth Wassell, Rowan University
 Sarah Braden, University of Utah

A181. Elementary Students' with Visual Impairments Conceptual Understanding of Sound

Margilee P. Hilson, The Ohio State University, hilson.4@osu.edu
 Sally M. Hobson, The Ohio State University
 Tiffany Wild, The Ohio State University

A183. Reported Barriers to Academic Success for Hispanic Physician Scientists: An Exploratory Qualitative Study

Devasmita Chakraverty, University of Virginia, dc5na@virginia.edu
 Donna B. Jeffe, Washington University in St. Louis
 Dorothy A. Andriole, Washington University in St. Louis
 Heather D. Wathington, University of Virginia
 Robert H. Tai, University of Virginia

A185. Under the Microscope: Exploring Equity and Diversity in a Decade of Science Education Research Literature

Linda J. Collins, The University of Akron, ljc9@uakron.edu
 Eugenia Johnson-Whitt, University of Toledo
 Jaclyn P. Gordon, University of Akron
 Kathleen S. Crooks, University of Akron
 Xin Liang, University of Akron
 Francis Broadway, The University of Akron

Strand 12: Educational Technology

Poster Session A

3:15pm – 4:15pm, Río Mar Ballroom 5

A187. Using Technology in Teaching Modeling: Scientific Modeling with Etoys

Morten Lundsgaard, University of Illinois at Urbana Champaign, mlundsga@illinois.edu
 Avigail Snir, University of Illinois at Urbana Champaign
 Lisa Blank, University of Montana, Missoula

A189. Teacher Enactment of Web GIS Tectonics Investigations

Alec M. Bodzin, Lehigh University, amb4@lehigh.edu
 Denise M. Bressler, Lehigh University
 Farah Valleria, Lehigh University

A191. Use of a Technology-based Elementary Curriculum focused on Scientific Inquiry: Unexpected Barriers

Amanda N. Clark, Florida State University, aclark@fsu.edu
 Sherry A. Southerland, Florida State University
 Paul Marty, Florida State University
 Victor D. Sampson, Florida State University
 Anne Mendenhall, Florida State University
 Nicole Alemanne, Florida State University

A193. Tracing the Development of FUTURE WORLDS: An Intelligent Cyberlearning System for Interactive Museum-based Sustainability Modeling

James Minogue, North Carolina State University, james_minogue@ncsu.edu
 Jon Rowe, North Carolina State University
 Marc Russo, North Carolina State University
 Arthur Kney, Lafayette University
 Eleni Lobene, North Carolina State University
 Brad Mott, North Carolina State University
 James Lester, North Carolina State University

A195. Exploring the Reasons for Using Electronic Books and the TPACK of Elementary Science Teachers

Syh-Jong Jang, Chung-Yuan Christian University, jang@cycu.edu.tw

A197. Computer-based Models in Chemistry Classrooms: Using Visual Literacy to Decode and Translate Model Representations

Noemi Waight, University at Buffalo, nwright@buffalo.edu
 Xiufeng Liu, State University of New York At Buffalo (SUNY)
 Roberto Gregorius, Canisius College
 Mihwa Park, University at Buffalo

A199. Simulating Science: Supporting Elementary and Secondary Teachers' Use of Computer Simulations

Amanda L. Goncz, University of Virginia, alg3cb@virginia.edu
 Randy L. Bell, Oregon State University
 Jennifer Maeng, University of Virginia
 Lindsay B. Wheeler, University of Virginia

A201. Indicators Impacting the STEM Career Pipeline Through Serious Educational Game Design and Development

Len Annetta, George Mason University, lannetta@gmu.edu
 Richard Lamb, George Mason University
 David B. Vallett, George Mason University
 Rebecca Cheng, George Mason University
 Karen Peterman, Karen Peterman Consulting

Strand 13: History, Philosophy, and Sociology of Science

Poster Session A

3:15pm – 4:15pm, Río Mar Ballroom 5

A203. What do Scientists Know About The Nature of Science? A Case Study of Turkish Graduate Research Assistants

Mehmet Aydeniz, The University of Tennessee, maydeniz@utk.edu
Kader Bilican, Ataturk University

A205. Comparison of NOS Teaching and Learning Approaches in the Context of a Research Apprenticeship Program for High School Students

Stephen R. Burgin, Old Dominion University, sburgin@odu.edu
Timothy M. Barko, University of Florida
Troy Sadler, University of Missouri

A207. Teacher's Religious Beliefs and the Teaching of Biological Evolution: A Case Study

Jose Soto-Sonera, University of Puerto Rico-Rio Piedras Campus,
jose.soto@upr.edu

A209. The Influence of a Philosophy of Science Course on Teachers' Views of SI and NOSK

Kostas Kampourakis, Illinois Institute of Technology,
kkamp@ath.forthnet.gr
Norman G. Lederman, Illinois Institute of Technology
Judith S. Lederman, Illinois Institute of Technology

Strand 14: Environmental Education

Poster Session A

3:15pm – 4:15pm, Río Mar Ballroom 5

A211. School Gardens: Promoting Environmental Awareness and Community Building

Isha Decoito, York University, IDeCoito@edu.yorku.ca

A213. Space, Place and Identity: Using Critical Geography as a Theoretical Lens in Environmental Education Research

Vanessa A. Klein, Kent State University, vklein1@kent.edu
Evan M Mooney, Kent State University

A215. The Impact of an Experiential Biodiversity Curriculum on High School Students in Dangriga, Belize

Marissa E. Bellino, City University of New York,
marissabellino@gmail.com
Stephen E. Harris, City University of New York

A217. Exploring Causal Structures of Variables Regarding Ecological Attitude on Insects

Jun-Ki Lee, Chonbuk National University, junki@jbnu.ac.kr
Minsu Ha, The Ohio State University
Sungwon Ko, Chonbuk National University

A219. An Examination of Agricultural Literacy Content in Upper Elementary Science Curricula

Farah L. Valleria, Lehigh University, fav203@lehigh.edu
Alec M. Bodzin, Lehigh University

A221. How Literate in Green Building the Undergraduates are in Taiwan

Quo-Cheng Sung, Chien Hsin University of Science and Technology,
tyhsaliang@gmail.com
Ming-Liang Lin, Kaohsiung Normal University, Taiwan
Ko-Yu Shiao, Chien-Hsin University of Science and Technology,
Taiwan
Chia-Chen Wei, Chien-Hsin University of Science and Technology,
Taiwan
Yi-Lin Jan, Chien-Hsin University of Science and Technology, Taiwan
Li-Ting Huang, Chien-Hsin University of Science and Technology,
Taiwan

A223. Lights, Camera, Action: Promoting Environmental Stewardship through Documentary Film Creation

Stephanie Hathcock, Old Dominion University, shath005@odu.edu
Daniel L. Dickerson, Old Dominion University

Strand 15: Policy

Poster Session A

3:15pm – 4:15pm, Río Mar Ballroom 5

A225. Practical Work in Science: Failure of Large Scale Reform in Pakistan

Nelofer Halai, Aga Khan University, nelofer.halai@aku.edu

A227. Time Spent Teaching Science and the Relationship to Accountability Policies

Eugene Judson, Arizona State University, Eugene.Judson@asu.edu

Poster Session B

4:15pm – 5:15pm, Río Mar Ballroom 6

Strand 1: Science Learning, Understanding and Conceptual Change

Poster Session B

4:15pm – 5:15pm, Río Mar Ballroom 6

B2. Global Climate Exchange – Students' Science Learning in a Global Classroom

Majken Korsager, University of Oslo, majken.korsager@uv.uio.no
Doris Jorde, Norwegian Centre for Science Education
James D. Slotta, Ontario Institute for Studies in Education

B4. Middle and High School Students' Responses to Climate Change: The Conflation of Mitigation and Adaptation

Matthew Kloser, University of Notre Dame, mkloser@nd.edu
Laura Bofferding, Purdue University

B8. Developing a Hypothetical Learning Progression for Plate Tectonics

Scott McDonald, Pennsylvania State University, smcdonald@psu.edu
Meredith Hill Bembenic, Pennsylvania State University
Peter R. Licon, Pennsylvania State University
Megan Pickard, Pennsylvania State University
Stephanie Danette Preston, Pennsylvania State University
Tanya Furman, Pennsylvania State University

B10. The Impact of Integrated Science and Math Instruction on Preservice Elementary Teachers' Nature of Science Views

Huseyin Colak, Northeastern Illinois University, h-colak@neiu.edu
Alex Carstensen, University of Illinois at Chicago

B12. Using Science Notebooks and Inscriptions to Promote Preservice Teachers' Understanding of the Nature of Science

Rita Hagevik, The University of North Carolina at Pembroke, rita.hagevik@uncp.edu
Patty Stinger-Barnes, The University of Tennessee

B14. Middle School Students' Understanding of Genetic Inheritance

Tamara J. Heck, Michigan State University, heckt@msu.edu
Joi Merritt, Michigan State University
Jacob Porter, Michigan State University
Kyle Erlenbeck, Michigan State University

B16. Conceptual Change in Elementary Kinematics and Ecology through the Development of Agent-based Computational Representations

Amanda C. Dickes, Vanderbilt University, amanda.c.dickes@vanderbilt.edu
Pratim Sengupta, Vanderbilt University
Gokul Krishnan, Vanderbilt University
Amy V. Farris, Vanderbilt University
Kara Krinks, Vanderbilt University

B18. Elementary Students Designing Investigations in Astronomy

Julia Plummer, Pennsylvania State University, jdp17@psu.edu
Arzu Tanis Ozcelik, Pennsylvania State University

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Poster Session B

4:15pm – 5:15pm, Río Mar Ballroom 6

B20. Synthesizing Modeling-based Instruction in Science Education from 1980 to 2010

Ji Shen, University of Georgia, jishen@uga.edu
Jine Lei, Syracuse University
Bahadır Namdar, University of Georgia
Ye Chen, Syracuse University

B22. Productive Failures: Deal with Troubles in Doing Science

Pei-Ling Hsu, University of Texas at El Paso, phsu3@utep.edu

B24. Teaching Multiple Modes of Representation: Impact on Middle School Science Learning

Ryan Nixon, Brigham Young University, rynixon@gmail.com
Leigh K. Smith, Brigham Young University

B26. The Pedagogy of Ingenuity: Scientific Creative Thinking in the Secondary Science Classroom

Allison Antink Meyer, Illinois State University, aameyer@ilstu.edu
Norman G. Lederman, Illinois Institute of Technology

B28. Enhancing Thinking Dispositions and Views on the Nature of Science using Writing-to-Learn-Science

Tili Wagner, Beit Berl College, tilw@beitberl.ac.il
Tamar Levin, Tel Aviv University
Dalia Imanuel, Beit Berl College

B30. The Antecedents of Adolescents' Continuing Motivation for Science Learning

David L. Fortus, Weizmann Institute of Science, david.fortus@weizmann.ac.il
Dana Vedder-Weiss, Weizmann Institute of Science

B32. Learning in a Virtual World: Teaching Concepts of Heat, Pressure and Random Motion

M. Gail Jones, North Carolina State University, gail_jones@ncsu.edu
Gina Childers, North Carolina State University
Brandon Emig, North Carolina State University
Joel Chevrier, Université Joseph Fourier Grenoble
Vanessa Stevens, North Carolina State University
Hong Tan, Purdue University

B34. Environmental Argumentation as Sociocultural Activity

Alandeom W. Oliveira, University at Albany, SUNY, aoliveira@albany.edu
Valarie L. Akerson, Indiana University
Martha Oldfield, University at Albany, SUNY

Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies

Poster Session B

4:15pm – 5:15pm, Río Mar Ballroom 6

B38. Children's Literature as an Invitation to Science Inquiry in the Early Years

Mellita M. Jones, Australian Catholic University,
mellita.jones@acu.edu.au

Karen J. McLean, Australian Catholic University
Clare Schaper, Australian Catholic University

B40. Young Children's Knowledge and Skills in Life Science—Implications for STEM Education

Robert Williams, University of Texas, rivers40@yahoo.com

Mary E. Hobbs, Center for STEM Education

B42. What Teachers' Want: Supporting Primary School Teachers in Teaching Science

Angela Fitzgerald, Monash University, Melbourne, Australia, angela.fitzgerald@monash.edu

Katrin Schneider, Monash University, Melbourne, Australia

B44. Exploring What Sustains Teachers' Attention and Responsiveness to Students' Scientific Thinking in the Classroom

Jennifer Richards, University of Maryland, College Park, jrich@umd.edu

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies

Poster Session B

4:15pm – 5:15pm, Río Mar Ballroom 6

B46. Teachers' Reflections on their Subject Matter Knowledge Structures and their Influence on Classroom Practice

Stephen Bartos, Illinois Institute of Technology, sbartos@iit.edu

Norman G. Lederman, Illinois Institute of Technology

Judith S. Lederman, Illinois Institute of Technology

B48. Teacher Beliefs and the Implementation of Curriculum Focusing on the Practices of Science

Sherry A. Southerland, Florida State University, ssoutherland@fsu.edu

Patrick J. Enderle, Florida State University

Victor D. Sampson, Florida State University

Jonathon Grooms, The Florida State University

B52. Factors Influencing Middle School Teachers' Planning and Facilitation of Visualization-based Instruction

Jacqueline Samuel, University of Southern Mississippi,
jacqueline.samuel@eagles.usm.edu

Kristy Halverson, University of Southern Mississippi

B54. Using Learning Progressions to Map High School Student Understandings of Molecular Genetics

Amber Todd, Wright State University, rosenberg.5@wright.edu

Lisa Kenyon, Wright State University

B56. Dimensions of Physics Teachers' Professional Knowledge

Sophie Kirschner, University Duisburg-Essen, sophie.kirschner@uni-due.de

Andreas Borowski, RWTH Aachen University

Hans Ernst Fischer, University Duisburg-Essen

B58. Influence of Teachers' CK and PCK on the Development of Students' System Thinking in Biology

Ute Harms, IPN - University of Kiel, Germany, harms@ipn.uni-kiel.de

Kerstin Münchhoff, IPN - University of Kiel, Germany

Miriam Waldmann, IPN - University of Kiel, Germany

Kristina Brandstädter, IPN - University of Kiel, Germany

B60. Using Beliefs and Science Education Experiences to Understand the Instructional Actions of Science Teachers

Dionne B. Jackson, Hendrix College, jackson@hendrix.edu

B62. The Periphery of Teaching: Influence of External Factors on Science Teacher Practice

Lauren E. Jetty, Syracuse University, lejetty@syr.edu

John W. Tillotson, Syracuse University

Monica Young, Syracuse University

Strand 5: College Science Teaching and Learning (Grades 13-20)

Poster Session B

4:15pm – 5:15pm, Río Mar Ballroom 6

B64. Preparing undergraduates for research experiences through laboratory courses

Meredith T. Knight, Boston University, meredith.knight1@gmail.com

Patricia Fortin, Boston University

Kenneth W. Adams, Boston University

Paul A. Lipton, Boston University

B66. Preparing Students for the Global Workforce: The Benefit of Undergraduate Research Experiences in Soft Skill Development

Penny S. Jeffrey, North Carolina State University, FREEDM Systems Center, pmshumak@ncsu.edu
Kristen Molyneaux, Firelight Foundation

B68. Using Manipulative Models to Develop Tree-Thinking

Donaven C. McLaurin, The University of Southern Mississippi, donaven.mclaurin@eagles.usm.edu
Kirsty Halverson, University of Southern Mississippi
Carrie J. Boyce, The University of Southern Mississippi

B70. Positive Impacts of Authentic Scientific Research Practice on First and Second Year Life Science Majors

Miriam Ferzli, North Carolina State University, mgferzli@unity.ncsu.edu
Johnavae Campbell, University of North Carolina at Chapel Hill
Mary Beth Hawkins, North Carolina State University
Damian Shea, North Carolina State University

B72. Promoting Epistemic Change in Students through a Physics Gateway Course: An Intervention Study

Xihui Wang, McGill University, xihui.wang@mail.mcgill.ca
Xiang Huang, Concordia University
Ahmed Ibrahim, McGill University
Calvin Kalman, Concordia University
Mark Aulls, McGill University

B74. Eye Tracking Assessment of the Cognitive Processes of Experts and Novice in Graph Reading

Joseph A. Harsh, Indiana University Science Education, jharsh@indiana.edu
Adam V. Maltese, Indiana University

B76. Is Brief Electricity and Magnetism Assessment a Biased Test?

Lin Ding, The Ohio State University, ding.65@osu.edu

B78. Utilizing Case-Based Learning in a Summer Pre-Freshman Bridge Program to Impact STEM Retention Rates

Drew Kohlhorst, Emory College, drew.kohlhorst@emory.edu
Patricia A. Marsteller, Emory College

Strand 6: Science Learning in Informal Contexts

Poster Session B

4:15pm – 5:15pm, Río Mar Ballroom 6

B80. Long Term Effects of a Science Focused Summer Camp on SAT Scores

Mary Margaret Capraro, Texas A&M University, mmcapraro@tamu.edu
Robert M. Capraro, Texas A&M University
James Morgan, Texas A&M University
Alpaslan Sahin, Texas A&M University
Niyazi Erdogan, Texas A&M University

B82. Viewing STEM Learning Through A Community-Wide Lens: The Synergies Project

John H. Falk, Oregon State University, falkj@science.oregonstate.edu
Lynn D. Dierking, Oregon State University
Nancy Staus, Oregon State University
Julie Haun-Frank, Oregon State University
William R. Penuel, University of Colorado
Jennifer Wyld, Oregon State University
Deborah Bailey, Oregon State University

B84. STEM After School: Using Careers to Build Middle School Students' Science Knowledge and Skills

Nancy Moreno, Baylor College of Medicine, nmoreno@bcm.edu
Barbara Tharp, Baylor College of Medicine
Gregory Vogt, Baylor College of Medicine
Alana Newell, Baylor College of Medicine

Strand 7: Pre-service Science Teacher Education

Poster Session B

4:15pm – 5:15pm, Río Mar Ballroom 6

B86. Tracing a Beginning Elementary Teacher's Identity Development for Science Teaching

Lucy Avraamidou, University of Nicosia, Cyprus, avraamidou.l@unic.ac.cy

B88. Pre-service Teacher Students' Concerns about the Implementation of Inquiry-Based Science Education

Vincent M. Schneider, Freie Universität Berlin, vincent.schneider@fu-berlin.de

B90. Developing Emergent PCK of Irish and Australian Pre-service Science Teachers during Teaching Placements

Adam Bertram, Monash University, adam.bertram@monash.edu
Louise Lehane, University of Limerick

B92. Examining a Teacher Preparation Program Participants' Perceptions and Confidence Levels in Standards-based Knowledge Types

Omah M. Williams, Texas A&M University, owillia2@tamu.edu
Hersh Waxman, Texas A&M University
Danielle B. Brown, Texas A&M University
Kayla Rollins, Texas A&M University
Beverly Alford, Texas A&M University

B94. Science Days a University-School Collaboration

Katherine A. Welsh, University of Wyoming, kmuir@uwyo.edu
Kate Kniss, Albany County School District #1

B96. Using Concept Maps and Vygotsky's Theory of Concept Development to Assess Elementary Preservice Teacher Knowledge

Pamela Harrell, University of North Texas, pam.harrell@unt.edu
Karthigeyan Subramaniam, University of North Texas
David Wojnowski, University of North Texas

B98. Teaching Science for Social Justice: Curriculum Development and Preservice Teacher Resistance

James C. Eslinger, OISE/UT, james.eslinger@utoronto.ca

B100. Elementary Preservice Teachers' Developing Identities as Science Teachers During STEM-focused Teacher Preparation

Sarah J. Carrier, North Carolina State University,
sarah_carrier@ncsu.edu
Daniell Difrancesca, North Carolina State University
Ellen McIntyre, North Carolina State University

B102. Preservice Teacher Noticing and Feedback: A Proxy for Emergent Science Teaching Knowledge and Practice

Amanda Benedict-Chambers, University of Michigan,
mbenedi@umich.edu

B104. Utilizing Photovoice to Empower Learners to Connect with and Care about Socio-scientific Issues

Kristin L. Cook, Bellarmine University, kcook@bellarmine.edu

Strand 8: In-service Science Teacher Education

Poster Session B

4:15pm – 5:15pm, Río Mar Ballroom 6

B106. The Variability of Self-Efficacy Patterns in Professional Development

Jan Alexis Nielsen, University of Copenhagen, janielsen@ind.ku.dk
Robert H Evans, University of Copenhagen

B108. Reflecting on Teaching Practices: The Alignment between Teaching a Lesson and Talking about It

Andri Christodoulou, University of Southampton,
a.christodoulou@soton.ac.uk
Maria Evagorou, University of Nicosia
Christina Howell-Richardson, Coventry University

B110. Professional Development for the integration of Engineering in High School STEM Classrooms

Jonathan E. Singer, University of Maryland, jsinger@umbc.edu
Julie Ross, University of Maryland
Taryn Bayles, University of Maryland
Yvette Lee, University of Maryland

B112. Professional Development and Improving Science Content and Inquiry Practice

Ted Fowler, University of Cincinnati, kathie_sund@hotmail.com
Kathie Maynard, University of Cincinnati
Shelly Micham, University of Cincinnati

B114. The Impact of an Immersive Course on K-8 Teachers' Content Knowledge

Emily C. Allen, Boston University, callen2@bu.edu
Peter S. Garik, Boston University
Margaret D. Nolan, Boston University
Thomas Hunt, Boston University
Thomas Hunt, Boston University
Enrique M Jariwala, Boston University
Glenn Stevens, Boston University
Bennett Goldberg, Boston University

B116. Physics and Physical Science Teachers' Knowledge Development through a Continuous Professional Development Context

April Nelms, University of North Georgia, anelms@northgeorgia.edu
Dennis W. Sunal, The University of Alabama
Cynthia Szymanski Sunal, The University of Alabama

B118. Professional Empowerment of Pre-K Teachers Over Three Years of Sustained Science Teacher Professional Development

Amy L. Moreland, The University of Texas at Austin The UTeach Institute, amoreland@austin.utexas.edu
Mary E. Hobbs, Center for STEM Education

B120. A Clearer Vision: Findings from the First Year of a Project Designed to Develop Teacher Leaders

Brett A. Criswell, Georgia State University, brett.criswell@gmail.com
Greg Rushton, Kennesaw State University

B122. Teacher Leadership Pathways as Seen Through Blogs

Somnath Sinha, University of Missouri, ssqh9@mail.missouri.edu
Candace R. Kuby, University of Missouri
Deborah L. Hanuscin, University of Missouri-Columbia

B128. Self-Efficacy as a Predictor of Science Content Knowledge

Robert E. Bleicher, California State University, Channel Islands,
bob.bleicher@csuci.edu
Julie L. Lambert, Florida Atlantic University

Strand 9: Reflective Practice

Poster Session B

4:15pm – 5:15pm, Río Mar Ballroom 6

B130. Understanding Preservice Elementary Teachers' Beliefs about Science Teaching and Reflective Practice

Cynthia Deaton, Clemson University, cdeaton@clemson.edu
Rory Tannebaum, Clemson University

B132. Photovoice as a Pedagogical Tool in Introductory Chemistry

Mary W. Stroud, Xavier University, stroud@xavier.edu

B136. Increasing Students' Motivation to Learn Science: An Action Research Project

Nancy Caukin, Eagleville High School / Middle, Tennessee State University, caukinn@tcschools.net

B138. Teaching the Greenhouse Effect with Inquiry-Based Computer Simulations: Improving Content and NOS Understanding

Edward Cohen, Piscataway Township Board of Education, EDtheScienceGuy@gmail.com
Timothy Zimmerman, Rutgers University

B140. A Narrative Inquiry into Teaching Physics as Inquiry: One Teacher's Journey

Paige K. Evans, University of Houston, pevans@uh.edu

Strand 10: Curriculum, Evaluation, and Assessment

Poster Session B

4:15pm – 5:15pm, Río Mar Ballroom 6

B144. The Inclusion of the Essential Features of Inquiry in Science Intermediate Grade Textbook Activities

Saeed Alshamrani, College of Education & Obiekan Chair for Science and Mathematics Education, King Saud University, sshamrani@ksu.edu.sa

Nasser Mansour, Exeter University

Abdulwali Aldahmash, The Excellence Research Center & Obiekan Chair for Science and Mathematics Education, King Saud University

B146. Effect of the Science Writing Heuristic Learning Approach on Future Achievement

Luke Postvedt, Iowa State University, postvedt@iastate.edu

Mack Shelley, Iowa State University

Joan Baenziger, Iowa State University

Dai-Trang Le, Iowa State University

Dai-Trang Le, Iowa State University

Brian M. Hand, University of Iowa

William Therrien, University of Iowa

B150. Educational Testing Techniques, Students' Conceptual Understanding and Applicability of Physics Knowledge: National and International Context

Tunde Owolabi, Lagos State University, Nigeria, owot2002@yahoo.co.uk

Peter A. Okebukola, Lagos State University

Hakeem Akintoye, Lagos State University

Solomon Aregbede, Lagos State University

Solomon Aregbede, Lagos State University

B152. Assessment Conversations in a Middle School Science Classroom: An Exploratory Study with English Language Learners and non English Language Learners

Preetha K. Menon, UC Santa Cruz, pmenon@ucsc.edu

B154. The Core Principles of Big Ideas of Physiology: Results of Student Responses to a Survey

Ann W. Wright, Canisius College, wrighta@canisius.edu

B156. Unpacking the Elements of Scientific Reasoning

Keisha Varma, University of Minnesota, keisha@umn.edu

Patricia Ross, University of Minnesota

Douglas W. Huffman, University of Kansas

Gillian Roehrig, University of Minnesota

Ying-Chih Chen, University of Minnesota

Leah McGuire, Measured Progress

Frances Lawrenz, University of Minnesota

B158. Beyond the Black Box: Investigating how Teachers use Student Performance Data to Make Pedagogical Decisions

Rachel Ruggirello, Washington University in St. Louis, ruggirello@wustl.edu

Phyllis Balcerzak, Washington University in St. Louis

Vicki L. May, Washington University in St. Louis

B160. Photo-documentation: An Alternative Approach to Investigating Middle School Students' Knowledge and Perceptions of Climate Change

Consuelo J. Morales, University of Michigan, Ann Arbor, cjmorale@umich.edu

B162. Coherences between Communication Competence, Decision Making and Content Knowledge in Chemistry

Iwen Kobow, University of Duisburg-Essen, Iwen.Kobow@uni-due.de

Maik Walpuski, University of Duisburg-Essen

B164. Seeking "Trickle Down": Examining Student Work for Evidence of Teacher Uptake of Educative Curriculum Materials

Amber S. Bismack, Pennsylvania State University, asb23@psu.edu

Anna Maria Arias, University of Michigan

Elizabeth A. Davis, University of Michigan

Annemarie S. Palincsar, University of Michigan

B166. Assessing Systemic Thinking and Quantitative Reasoning: Understanding Factors Explaining the Decline of Timber Rattle Snakes

Michele Crowl, Pennsylvania State University, michelecrowl@gmail.com
Peter R. Licona, Penn State University
Richard A. Duschl, Penn State University

Strand 11: Cultural, Social, and Gender Issues

Poster Session B

4:15pm – 5:15pm, Río Mar Ballroom 6

B168. Cross-cultural and Place-based Education of the Cofan

William R. Veal, College of Charleston, vealw@cofc.edu

B172. Through Their Lens: The Potential of Photovoice for Documentation of Environmental Perspectives among African Teachers

Cassie Quigley, Clemson University, cassieq@clemson.edu
James Dogbey, Clemson University
Megan Che, Clemson University
Jeff Hallo, Clemson University
Jeff Hallo, Clemson University
Patrick Womac, Clemson University

B174. Creating School Scientific Communities Among Urban Refugee ELL Populations

Joseph J. Johnson, Edinboro College, JJOHNSON@edinboro.edu
Randy K. Yerrick, State University of New York at Buffalo

B176. Latinas: Pathways to Success in Science

Gillian U. Bayne, Lehman College CUNY, gillian.bayne@lehman.cuny.edu
Lorena Claeys, University of Texas at San Antonio
Belinda Flores, University of Texas at San Antonio
Alejandro J. Gallard, Georgia Southern University
Wesley Pitts, Lehman College, CUNY
Diane Torres-Velasquez, University of New Mexico

B178. Student's Socioeconomic Background and School's Socio-economic Composition Relation to the Student's Science Performance

Imbi Henno, PhD student, imbi.henno@tlu.ee
Priit Reiska, Professor

B180. We Stumble, Fall, Get Up, and Continue Walking; Latino/a Students' Science Attitudes

Kathryn Scantlebury, University of Delaware, kscantle@udel.edu
Beth Wassell, Rowan University
Sarah Braden, University of Utah

B182. How Gender, Ethnicity and Experience Influence Scientist Identity and Career Attitudes among Research Program Students

Brandon J. Nzekwe, The National High Magnetic Field Laboratory, nzekwe@magnet.fsu.edu
Susan Carol Losh, Florida State University

Strand 12: Educational Technology

Poster Session B

4:15pm – 5:15pm, Río Mar Ballroom 6

B184. Augmented Reality Supports Instruction during Ecosystem Science Field Trips

Amy M. Kamarainen, New York Hall of Science, akamarainen@nysci.org
Shari Jackson Metcalf, Harvard University
Tina Grotzer, Harvard University
Chris Dede, Harvard University

B186. ConSOL: A Computer-Based Diagnostic Instrument Based on the "Two-Tier Multiple-Choice Test Items" Method

Jesus Vazquez-Abad, Universite de Montreal, j.vazquez-abad@umontreal.ca
Isabelle Harpin, Universite de Montreal
Caroline Cormier, Universite De Montreal
Alexandre Tremblay, Universite de Montreal
Andoni Garritz, Facultad De Quimica, UNAM
David F. Treagust, Curtin University

B188. Comparing Student Discourse and Actions while Experimenting with Physical and Virtual Manipulatives in Physics

Georgios A. Olympiou, University of Cyprus, olympiog@ucy.ac.cy
Zacharias C. Zacharia, University of Cyprus

B190. Individual Differences, Flow Experience, and Science Learning in Serious Educational Games

Rebecca Cheng, George Mason University, wcheng3@gmu.edu
Leonard A. Annetta, George Mason University
Richard Lamb, George Mason University
David B. Vallett, George Mason University

B192. Effects of SEG Design on Visuospatial Ability, 21st Century Skills, and STEM Career Selection

David B. Vallett, George Mason University, dvallett2@gmu.edu
Len Annetta, George Mason University
Richard Lamb, George Mason University
Rebecca Cheng, George Mason University

B194. Teacher-Centered Design: Improving a K-12 Science Curriculum and its Dashboard

Virginia W. Snodgrass Rangel, Rice University, Center for Digital Learning and Scholarship, vsr@rice.edu

Carlos Monroy, Rice University Center for Technology in Teaching and Learning

J. Reid Whitaker, Executive Director, Rice University Digital Learning and Scholarship CEO, STEMscopes

B196. Exploring Virtual Worlds: Causal Understanding and Data-Collection Behaviors in an Ecosystems-Based Multi-User Virtual Environment

Tina Grotzer, Harvard University

Michael S. Tutwiler, Harvard University

Shari J. Metcalf, Harvard University

Amy M. Kamarainen, University of Wisconsin

Chris Dede, Harvard University

B198. Effects of Controlled Experimentation and a Problematic Narrative on Learning Outcomes in a Chemistry Simulation

Susan M. Letourneau, New York University & CUNY,

susan.letourneau@nyu.edu

Anna G. Brady, New York University

Catherine E. Milne, New York University

Jan L. Plass, New York University

Bruce D. Homer, CUNY Graduate Center

Trace Jordan, New York University

Ruth Schwartz, New York University

B200. Multiple Representations, Collaboration and Student Reasoning: Designing Online Environments for Learning About Global Heat Transfer

Florence R. Sullivan, University of Massachusetts, Amherst,

fsullivan@educ.umass.edu

Christopher N. Hill, Massachusetts Institute of Technology

Richard Adrion, University of Massachusetts, Amherst

Nat Turner, University of Massachusetts, Amherst

David Hart, University of Massachusetts, Amherst

Strand 13: History, Philosophy, and Sociology of Science

Poster Session B

4:15pm – 5:15pm, Río Mar Ballroom 6

B202. Modeling Relationships among Aspects of the Nature of Science: Representing Co-Occurrences with Epistemic Network Analysis

Erin E. Peters-Burton, George Mason University, epeters1@gmu.edu

B204. The Depiction of the Phenomenon of Industrial Melanism in American Biology Textbooks

Janice M. Fulford, Western Michigan University,

janice.m.fulford@wmich.edu

David W. Rudge, Western Michigan University

B206. Stakeholders' Views on Scientific Literacy in Germany – Results from an International Delphi Study on Science Education

Theresa Schulte, Freie Universität Berlin,

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Claus Bolte

B208. Science Research to Science Teaching: Developing Preservice Teachers' Knowledge and Pedagogy for NOS and Inquiry

Renee S. Schwartz, Western Michigan University,

r.schwartz@wmich.edu

Cathy K. Northcutt, Western Michigan University

Gunkut Mesci, Western Michigan University

Susan Stapleton, Western Michigan University

Strand 14: Environmental Education

Poster Session B

4:15pm – 5:15pm, Río Mar Ballroom 6

B210. Epistemic Contributions to Students' Autonomous Socioscientific Actions

John Lawrence Bencze, University of Toronto, larry.bencze@utoronto.ca

Mirjan Krstovic, Peel District School Board

B212. Secondary Science Teachers' and Students' Climate Change Conceptions and Teachers' Climate Change Teaching Practices

Benjamin C. Herman, University of South Florida, bcherman@usf.edu

Allan Feldman, University of South Florida

Vanessa Vernaza-Hernandez, University of South Florida

B214. Fostering Transfer of Ecosystem Concepts

Yawen Yu, Rutgers, The State University of New Jersey, yawen.

yu.tranquil@gmail.com

Cindy E. Hmelo-Silver, Rutgers University

Suparna Sinha, Rutgers University

Catherine Eberbach, Rutgers University

Rebecca Jordan, Rutgers University

B216. Understanding Attitudes Towards Nature and Sustainability Among Students at an Urban Community College

Christina P. Colon, Kingsborough Community College,

christina.colon@kbcc.cuny.edu

B218. Getting Outside: Three Teachers' Stories of Using the Schoolyard for Elementary Teaching

Kelly Feille, Texas Christian University, k.k.nelson@tcu.edu

B222. Students' Emotions in a Climate Change Course

Elizabeth Hufnagel, Penn State University, exh5064@psu.edu

B224. Spatial Understanding as a Means to More Sustainable Decision Making

Heather J. Skaza, University of Nevada-Las Vegas,

heaska77@gmail.com

Kent J. Crippen, University of Florida

Cindy L. Kern, University of Nevada, Las Vegas

Publisher Reception

Reception by invitation

6:00 PM – 8:00 PM

Springer Reception (By invitation only)

Caribbean Salon 3

Graduate Student and Early Career Scholars

Informal Social – On Your Own

7:00pm – 8:00pm, Poolside

Strand 15: Policy

Poster Session B

4:15pm – 5:15pm, Río Mar Ballroom 6

B226. Failure: The Next Generation - Why Rigorous Standards are Not Sufficient to Improve Science Learning

Mary A. Bair, Grand Valley State University, bairma@gvsu.edu

David E. Bair, Grand Valley State University

B228. Aligning Science Learning Progressions and the Common Core State Standards for Mathematics

Tara T. Craig, The University of Texas at Austin, tara.craig@utexas.edu

Cesar Delgado, University of Texas at Austin

Evening/Social Events

Membership and Elections Committee Sponsored Session

Graduate Student Forum

The Graduate Student Forum aims to guide and encourage beginning researchers by discussing various problems that may arise, e.g. when completing the dissertation or searching for a position. Attendees of the forum are given the opportunity to question a panel of experienced colleagues on all matters of academic interest.

5:30pm – 7:00pm, Río Mar Salon 2

Presenters:

Eileen Parsons, University of North Carolina, Chapel Hill, rparsons@email.unc.edu

Kathryn Drago, East Carolina University

Takumi Sato, Michigan State University

Monday, April 8, 2013

Conference Registration

7:00am – 5:00pm, Río Mar Atrium

Committee Meetings

7:00am – 8:15am

NARST Outstanding Paper Award Selection Committee
7:00am – 8:15am, Río Mar Salon 1

Outstanding Doctoral Research Award Selection Committee
7:00am – 8:15am, Caribbean Salon 1

JRST Award Selection Committee
7:00am – 8:15am, Caribbean Salon 2

Early Career Research Award Selection Committee
7:00am – 8:15am, Sea Gull Room

Distinguished Contributions in Research Award Committee
7:00am – 8:15am, Heron Room

Equity and Ethics Committee Meeting
7:00am – 8:15am, Río Mar Salon 2

External Policy and Relations Committee Meeting
7:00am – 8:15am, Río Mar Salon 3

Research Committee Meeting
7:00am – 8:15am, Río Mar Salon 4

Membership and Election Committee Meeting
7:00am – 8:15am, Río Mar Salon 7

International Committee Meeting
7:00am – 8:15am, Río Mar Salon 8

Program Committee Meeting
7:00am – 8:15am, Río Mar Salon 9

Publications Advisory Committee Meeting
7:00am – 8:15am, Río Mar Salon 10

Concurrent Session #7

8:30am – 10:00am

Administrative Sponsored Session

Symposium - Developing a More Socially Responsible STEM Education through Community Engagement: Impact of NARST's First LSEP

8:30am-10:00am, Pelican Room

Presider:

Mei-Hung Chiu, National Taiwan Normal University

Presenters:

Astrid T. Sinnes, Norwegian University of Life Sciences, Ås, Norway,
astrid.sinnes@umb.no

William C. Kyle, Jr., University of Missouri - St. Louis

Mercy Kazima, Chancellor College, University of Malawi

Franci Schabort, Norwegian University of Life Sciences, Ås, Norway

Alice Saite, Mzuzu University, Malawi

Strand 1: Science Learning, Understanding and Conceptual Change

Tracing Conceptual and Computational Thinking in Technology-rich Instructional Interventions

8:30am-10:00am, Río Mar Salon 1

Presider:

Pratim Sengupta

Development of High School Students' Understanding of How Objects Interact Using Computer-Based Materials

Jane J. Lee, Michigan State University, leejaney@msu.edu

Steven McGee, North Western University

Jennifer Duck, The Learning Partnership

Joseph S. Krajcik, Michigan State University

Tracing Learning Trajectories for Understanding Ecosystems

Catherine Eberbach, Rutgers University,

catherine.eberbach@gse.rutgers.edu

Cindy E. Hmelo-Silver, Rutgers University

Suparna Sinha, Rutgers University

Rebecca Jordan, Rutgers University

An Integrated Approach for Learning Kinematics and Developing Computational Thinking in Elementary Grades

Amy V. Farris, Vanderbilt University, amy.voss@Vanderbilt.Edu

Pratim Sengupta, Vanderbilt University

Gokul Krishnan, Vanderbilt University

Amanda C. Dickes, Vanderbilt University

Kara Krinks, Vanderbilt University

Conceptual Change in Physics through Use of Digital Games

Kara Krinks, Vanderbilt University, kara.krinks@vanderbilt.edu
 Pratim Sengupta, Vanderbilt University
 Amanda C. Dickes, Vanderbilt University
 Amy V. Farris, Vanderbilt University
 Gokul Krishnan, Vanderbilt University

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Gender-Related Issues and Science Learning
 8:30am-10:00am, Río Mar Salon 10

Presider:

Miia Rannikmae

Gender and Grade Differences in Elementary School Science Students' Engineering Identity Development

Ji Hyun Yu, Purdue University, yu45@purdue.edu
 Brenda Capobianco, Purdue University
 Brian French, Washington State University

Whatever You Do, You will Never get them to Work; Male Students in Physics

Alice Cottaar, Eindhoven University of Technology, a.cottaar@tue.nl

The Influence of Context on Success Summer Research Experiences in the SETGO Program

Tracy L. Huziak-Clark, Bowling Green State University, thuziak@bgsu.edu
 Moira Van Staaden, Bowling Green State University

Inquiry Based Science and Technology Enrichment Program: Green Earth Enhanced with Inquiry and Technology

Hanna Kim, Northeastern IL University, hkimdepaul@gmail.com

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Related Paper Set - Exploring Students' Reasoning Around Models in Earth Science

8:30am-10:00am, Caribbean Salon 2

Discussant:

Christina V. Schwarz, Michigan State University

Measurement of Analogical Reasoning Around Earth Science Models

Ann E. Rivet, Teachers College Columbia University, rivet@tc.columbia.edu
 Kim Kastens, EDC
 Mariana Schmalstig, Teachers College Columbia University

Investigating Variations in Students' Analogical Reasoning between Visual Representations and Earth Data

Cheryl A. Lyons, Teachers College Columbia University, cal2154@columbia.edu
 Ann E. Rivet, Teachers College Columbia University

Emergent Science Practices Around Physical Models in Earth Science

Alison R. Miller, Teachers College Columbia University, mar2218@columbia.edu
 Ann E. Rivet, Teachers College Columbia University

Students' Use of Physical Models to Experience Key Aspects of Scientists' Knowledge-Creation Process

Kim Kastens, EDC, kastens@ldeo.columbia.edu
 Ann E. Rivet, Teachers College Columbia University

Discussion: Exploring Students' Reasoning Around Models In Earth Science

Christina V. Schwarz, Michigan State University, cschwarz@msu.edu

Strand 5: College Science Teaching and Learning (Grades 13-20)

Impact of STEM on Student Success

8:30am-10:00am, Parrot Room

Presider:

Mercy Oqunsola-Bande

Increasing Student Performance in Large Lecture STEM Courses: A Team Approach to Successful Learning

Kate Popejoy, University of North Carolina at Charlotte, kate.popejoy@uncc.edu
 Kathryn Asala, University of North Carolina at Charlotte

STEM Migration, Retention and Graduation Patterns within a Public University System

Erin D. Knepler, University System of Maryland, eknepler@usmd.edu
 Nancy S. Shapiro, University System of Maryland
 David May, University System of Maryland

Utilizing Case-Based Learning in a Summer Pre-Freshman Bridge Program to Impact STEM Retention Rates

Drew Kohlhorst, Emory College, drew.kohlhorst@emory.edu
 Patricia A. Marsteller, Center for Science Education Emory

STEM Doctoral Student Professional Development in Teaching: Outcomes of a High-Engagement Program

Mark Urban-Lurain, Michigan State University, urban@msu.edu
 Luanna B. Prevost, Michigan State University
 Henry Campa, III, Michigan State University

Strand 6: Science Learning in Informal Contexts

Novel Methods for Studying Informal Learning

8:30am-10:00am, Sea Gull Room**Presider:**

Erika D. Tate

Investigating Students' Interest in Chemistry by Using their Self-Generated QuestionsBetül Demirdögen, Middle East Technical University,
dbetul@metu.edu.tr

Gultekin Cakmakci, Hacettepe University

The Half-Life of a 'Teachable Moment': The Case of Nobel LaureatesAyelet Baram-Tsabari, Technion - Israel Institute of Technology,
ayelet@technion.ac.il

Elad Segev, Tel Aviv University

From Mouths to Minds: Student Problem-Solving Conversations at an AquariumJoy Kubarek-Sandor, John G. Shedd Aquarium,
jkuba@sheddaquarium.org

Gorjana Popovic, Illinois Institute of Technology

Motivating Factors that Lead to Participation in an Urban County-Level Science Fair

Penny L. Hamrich, Drexel University, plh33@drexel.edu

Kathleen A. Fadigan, Pennsylvania State University

David M. Majerich, Georgia Institute of Technology

Strand 7: Pre-service Science Teacher Education

Understanding the Discursive Practices in Science

Classrooms

8:30am-10:00am, Canary Room**Presider:**

Asli Sezen

Pre-Service Teacher Science Discourses: Science as Practices Versus Science as Knowledge

Mohammad A. Basir, Oakland University, mohammad.basir@gmail.com

Supporting Science Discourse Practices in Pre-Service Teachers

Imelda L. Nava, UCLA, inava@ucla.edu

"Discovering Plate Boundaries in Data-Rich Environments": Supporting Pre-Service Teachers Involvement in Unique Practices Of Geosciences

Asli Sezen-Barrie, Towson University, asezen@towson.edu

Joel Moore

Science Writing Heuristic: An Inquiry-Based Laboratory Approach to Promote Science**Achievement in General Chemistry Laboratory**

Jale Ercan, Gazi University, jaleercan@gazi.edu.tr

Hilal Yanis, Gazi University

Meltem Irmak, Gazi University

Strand 7: Pre-service Science Teacher Education

Beliefs, Attitudes, and Perspectives on Science Teaching

8:30am-10:00am, Río Mar Salon 9**Presider:**

Todd Hunter, University of Texas at Austin

Promoting Activity Evaluation and Teacher Efficacy among Future Elementary Teachers Using the Science Teaching ToolkitJoe Covert, North Georgia College & State University,
jsovert@northgeorgia.edu

Paul Baldwin, North Georgia College & State University

Preservice Science and Social Studies Teachers' Perspectives on Science and Society: An Integrated Methods Course

Lisa A. Borgerding, Kent State University, ldonnell@kent.edu

Alicia Crowe, Kent State University

Andrew Hostetler, Vanderbilt University

Rajlakshmi Ghosh, Kent State University

The Effects of Course Instructions on**Implementation of Assessment for Students'****Learning and Pre-Service Science Teachers' Beliefs**Hye-Eun Chu, Nanyang technological University,
hyeeun.chu@gmail.com**Improving Preservice Elementary Teacher Attitudes Towards Science: A Comparison of Informal and Formal Field Experiences**

Gail L. Dickinson, Texas State University, dickinson@txstate.edu

Strand 8: In-service Science Teacher Education

Experiences of Teachers in the Induction Years

8:30am-10:00am, Río Mar Salon 4**Presider:**

Huseyin Colak

Beginning Teachers' Use of Video Annotation in an Online Teacher Induction Program

Gillian Roehrig, University of Minnesota, roehr013@umn.edu

Barbara Billington, University of Minnesota

Joshua Ellis, University of Minnesota

Justin McFadden, University of Minnesota

Tasneem Anwar, University of Minnesota

Beginning Secondary Science Teachers' Laboratory Practices: A Five-Year Study

Sissy S. Wong, University of Houston, sissywong@uh.edu
 Jonah B. Firestone, Washington State University-Tricities
 Julie A. Luft, University of Georgia
 Charles Weeks, Arizona State University
 Eunjin Bang

A Science Teacher Without a Room: The Affordances and Constraints of Floating

Shannon L. Dubois, University of Georgia, sdubois@uga.edu
 Julie A. Luft, University of Georgia

How Understanding Neuroscience Impacts Teachers' Pedagogical Beliefs

Selcen Guzey, University of Minnesota, selcenkendir@yahoo.com
 Char Ellingson, University of Minnesota
 Gillian Roehrig, University of Minnesota
 Janet Dubinsky, University of Minnesota

Strand 10: Curriculum, Evaluation, and Assessment

Related Paper Set - Assessing Scientific Argumentation:
 Challenges and Future Directions
8:30am-10:00am, San Cristobal

Developing Assessment for a Learning Progression in Argumentation: Lessons Learned

Jonathan F. Osborne, Stanford University, osbornej@stanford.edu
 Bryan Henderson, Stanford University
 Anna MacPherson, Stanford University
 Evan Szu, Stanford University

Measuring Students' Scientific Argumentation Associated with Uncertain Current Science

Hee-Sun Lee, University of California, Santa Cruz, hlee58@ucsc.edu
 Amy Pallant, The Concord Consortium
 Sarah Pryputniewicz, The Concord Consortium
 Ou Lydia Liu, Educational Testing Service

Developing a Framework for Inquiry and Argumentation About Carbon-Transforming Processes

Jenny M. Dauer, Michigan State University, dauerjen@msu.edu
 Hannah K. Miller, Michigan State University
 Charles W. Anderson, Michigan State University

Assessing Students' Ability to Argue Across Multiple Modalities

Suna Ryu, Lawrence Hall of Science, UC Berkeley, sunaryu@ucla.edu
 Seth Corrigan, Lawrence Hall of Science, UC Berkeley
 Amanda M. Knight, Boston College
 Katherine L. McNeill, Boston College

Effects Of Task Goals on Individuals' Engagement with Claims and Evidence in Everyday Settings

Jacqueline Wong, University of California, Los Angeles, writejackie@gmail.com
 William A. Sandoval, University of California, Los Angeles

Strand 10: Curriculum, Evaluation, and Assessment

Innovations in Assessment and Evaluation in Science Curriculum

8:30am-10:00am, Río Mar Salon 2

Presenter:

Min Li

Gathering Multiple Sources of Content Validity Evidence to Guide Development of a Genomics-Bioinformatics Assessment

Chad Campbell, The Ohio State University, campbell.742@osu.edu
 Ross H. Nehm, The Ohio State University
 Brian Morton, Columbia University

The Link Between Sequence of Item Context and Students' Performance in Science Assessment

Ting Wang, University of Washington, tingwang@uw.edu
 Min Li, University of Washington
 Maria Araceli Ruiz-Primo, University of Colorado Denver
 Phonraphee Thummaphan, University of Washington
 Derek Y. Zhao, University of Washington

Comparing Item Formats of Instructionally Sensitive Assessments

Min Li, University of Washington, minli@u.washington.edu
 Maria Araceli Ruiz-Primo, University of Colorado Denver
 Ting Wang, University of Washington
 Michael Giamellaro, University Of Colorado, Denver
 Kellie Wills, University of Washington, Seattle
 Derek Y. Zhao, University of Washington, Seattle

Evaluation of a New Multiple-True-False Concept Inventory for Diagnosing Mental Models of Natural Selection

Meghan Rector Federer, The Ohio State University, federer.21@osu.edu
 Ross H. Nehm, The Ohio State University
 Elizabeth P. Beggrow, The Ohio State University
 Minsu Ha, The Ohio State University
 John Opfer, The Ohio State University

Strand 10: Curriculum, Evaluation, and Assessment

Symposium - Assessment and Next Generation K-12
Science Standards

8:30am-10:00am, El Morro 1 & 2

Presider:

Cari Herrmann Abell, American Association for the Advancement
of Science

Discussant:

Nancy B. Songer, University of Michigan

Presenters:

Gavin W. Fulmer, National Institute of Education (Singapore)
Jerome Shaw, University of California, Santa Cruz
Knut Neumann, Leibniz-Institute for Science and Mathematics
Education (IPN), University of Kiel
Richard Lehrer, Vanderbilt University

Strand 11: Cultural, Social, and Gender Issues

Symposium - Unequal Distribution of Resources for K-12
Science Instruction: Data from a Major National Study

8:30am-10:00am, Río Mar Salon 8

Presider:

Patrick S. Smith, Horizon Research, Inc.

Presenters:

Patrick S. Smith, Horizon Research, Inc.,
ssmith62@horizon-research.com
Michele M. Nelson, Horizon Research, Inc.
Eric R. Banilower, Horizon Research, Inc.
Peggy Trygstad, Horizon Research, Inc.

Strand 12: Educational Technology

Related Paper Set - Authentic Bioinformatics Tools
and Database in the Biology Classroom: Affordances,
Challenges, and Implications for Learning

8:30am-10:00am, Río Mar Salon 3

Presider:

Anat Yarden, Weizmann Institute of Science

Discussant:

John R. Jungck, University of Delaware

Implications of Nature of Technology for Tool**Enactment in Precollege Science Classrooms**

Fouad Abd-El-Khalick, University of Illinois at Urbana-Champaign,
fouad@illinois.edu
Noemi Waight, University at Buffalo

Bringing Bioinformatics into High School**Biotechnology Curriculum through a Scientifically
Authentic Learning Environment**

Yossy Machluf, Weizmann Institute of Science,
machluf.yossy@weizmann.ac.il
Hadas Gelbart, Weizmann Institute of Science
Anat Yarden, Weizmann Institute of Science

**Embedding Bioinformatics within Independent
Student Research**

Amy Nisselle, DNA Learning Center Cold Spring Harbor Laboratory,
NY, anissell@cshl.edu
Oscar Pineda-Catalan, DNA Learning Center Cold Spring Harbor
Laboratory, NY
David Micklos, DNA Learning Center Cold Spring Harbor
Laboratory, NY

**Bioinformatics for Life Scientists: Why It's so
Important to Train the Trainers**

Maria Victoria Schneider, European Bioinformatics Institute,
Cambridge, UK, vicky@ebi.ac.uk
Pedro L. Fernandes, Gulbenkian Institute, Oeiras, Portugal

Strand 12: Educational Technology

Related Paper Set - Connecting and Assessing Informal and
Formal Understanding in Digital Games and Virtual Worlds

8:30am-10:00am, Caribbean Salon 1

**Using a Virtual World to Reveal Students' Intuitive
Causal Assumptions about Ecosystems**

Tina Grotzer, Harvard University, Tina_Grotzer@harvard.edu
M. Shane Tutwiler, Harvard University
Amy Kamarainen, New York Hall of Science
Shari Metcalf, Harvard University
Chris Dede, Harvard University

**The Impact of a Serious Educational Game
Design and Development Project on High School
Science Students**

Len Annetta, George Mason University, lannetta@gmu.edu
Richard Lamb, George Mason University
David Vallett, George Mason University
Rebecca Cheng, George Mason University

**Games, Collaboration, and Physics: How the
Structures of Informal Collaboration Affect Learning**

Douglas B. Clark, Vanderbilt University, doug.clark@vanderbilt.edu
Blaine Smith, Vanderbilt University
Caroline Wilson, Vanderbilt University
Joy Ssebikindu, Vanderbilt University
Stephanie Zuckerman, Vanderbilt University

**Leveling Up: Measuring Tacit Science Understanding
through Gameplay**

Jodi Asbell-Clarke, EdGE at TERC, jodi_asbell-clarke@terc.edu
Elizabeth Rowe, EdGE at TERC
Teon Edwards, EdGE at TERC
Jamie Larsen, EdGE at TERC

Using Data from Virtual Environment-Based Assessments to Scaffold Student Demonstration of Learning and Teacher Practice Change

Diane Jass Ketelhut, University of Maryland, College Park,
djkk@umd.edu

Uma Natarajan, Temple University

Angela Shelton, North Carolina State University

Strand 13: History, Philosophy, and Sociology of Science

SSI and Argumentation

8:30am-10:00am, Heron Room

Presider:

Catherine M. Koehler

STEM Education as a Deficit Framework: A Sociocultural Socioscientific Perspective

Dana L. Zeidler, University of South Florida, zeidler@usf.edu

The Relationship between College Students' Epistemic Beliefs and their Socio-Cultural Views of Science

Brendan E. Callahan, Kennesaw State University,
bcallah7@kennesaw.edu

Samantha R. Fowler, Clayton State University

Socio-Scientific Issues as a Transformative Approach: Based on Activity Theory Perspectives

Hyun Ok Lee, Ewha Womans University, philian@empas.com

Hyunju Lee, Ewha Womans University

Kyunghee Choi, Ewha Womans University

The Role of Scientific Evidence in Socio-Scientific Deliberation

Jan Alexis Nielsen, University of Copenhagen, janielsen@ind.ku.dk

Strand 14: Environmental Education

Sociocultural Approaches to Researching and Teaching Environmental Education

8:30am-10:00am, Río Mar Salon 7

Environmental Identity Development through Social Interactions: Investigation of an Overseas Environmental Education Program

Sarah R. Stapleton, Michigan State University, skriggs@gmail.com

Using the Natural Environment as Text as an Integrating Context for Teaching and Learning

Joan M. Chambers, Lakehead University, joan.chambers@lakeheadu.ca

Christy Radbourne, Lakehead Public Schools

Break

10:00am – 10:30am, Río Mar Ballroom Foyer

Plenary Session #2

Research on Ecological Context and Place: Investigating the Landscape of STEM Opportunities

10:30am – 11:50am, Río Mar Ballroom 5 and 6

Presider:

Lynn A. Bryan

Keynote Presenter: William F. Tate IV, Washington University in St. Louis

Awards Luncheon

12:00pm – 2:00pm, Vista Verde Garden

Concurrent Session #8

2:15pm – 3:45pm

International Committee Sponsored Session

Contributions from European Science Education Research Association - Related Paper Set - Students' Choices of, and Transition into, STEM Programmes in Higher Education

2:15pm-3:45pm, Canary Room

Presiders:

Sibel Erduran, University of Bristol

Manuela Welzel-Breuer, University of Education Heidelberg, Germany

Discussant:

Kenneth G. Tobin, The City University of New York

European Students, Motivations and Expectations in STEM Studies

Giuseppe Pellegrini, Observa Science in Society, Italy,
pellegrini@observanet.it

The Influence of School-Related Factors on Students' Choice of Science Courses

Jaume Ametller, University of Leeds, J.Ametller@education.leeds.ac.uk
Jim Ryder, University of Leeds

Belonging and a 'Place' in STEM at University: A Focus Group Study of Undergraduate Students' Degree Choice

Justin Dillon, King's College London, justin.dillon@kcl.ac.uk
Elaine Regan, King's College London

Students' Negotiation Strategies when Meeting STEM. A Longitudinal Study of Students' Transition to Higher Education

Henriette T. Holmegaard, University of Copenhagen, Denmark, hh@ind.ku.dk
Lene M. Madsen, University of Copenhagen, Denmark
Lars Ulriksen, University of Copenhagen, Denmark

Strand 1: Science Learning, Understanding and Conceptual Change

Exploring and Assessing Students' Reasoning
2:15pm-3:45pm, Río Mar Salon 1

Presider:

Savannah E. Lodge-Scharff

The Effect of the Learning Content Nano Size-Effects on Students' Ideas about Matter

Sebastian Ritter, Universitaet Duisburg-Essen, sebastian.ritter@uni-due.de
Elke Sumfleth, Universitaet Duisburg-Essen
Eckart Hasselbrink, Universitaet Duisburg-Essen

Exploring the Use of Students Self-Explanations when Exploring the Particulate Nature of Matter

John C. Bedward, Buena Vista University, bedward@bv.edu
Eric N. Wiebe, North Carolina State University

Development of a Test Instrument to Investigate Students' Learning Trajectories in Chemistry Contents

Nora Ferber, University of Duisburg-Essen, nora.ferber@uni-due.de
Markus Emden, University of Duisburg-Essen,
Department of Chemistry
Elke Sumfleth, Universitaet Duisburg-Essen

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Symposium - PROFILES- Reflections on Motivational Science Education for 21st Century Scientific Literacy
2:15pm-3:45pm, Caribbean Salon 2

Profiles- Reflections on Motivational Science Education for 21st Century Scientific Literacy

Jack Holbrook, University of Tartu, jack@ut.ee
Miia Rannikmae, University of Tartu
Claus Bolte, Freie Universitaet Berlin
Avi Hofstein, The Weizmann Institute of Science
Rachel - Mamlok-Naaman, The Weizmann Institute of Science
Franz Rauch, Alpen Adria Universitaet, Klagenfurt
Sabine Streller, Freie Universitaet Berlin
Tuula Keinonen, University of Eastern Finland

Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies

Teaching Science in the Early Years
2:15pm-3:45pm, Río Mar Salon 3

Presider:

Charlene M. Czerniak, University of Toledo

Science: The Creation of a Coding System to Evaluate Early Childhood Science Teaching

Joan N. Kaderavek, University of Toledo, joan.kaderavek@utoledo.edu
Tamala S. North, University of Toledo
Regina Rothshtein, University of Toledo
Hoangha Dao, University of Toledo
Nicholas Liber, University of Toledo
Geoff Milewski, University of Toledo
Scott S. Molitor, University of Toledo
Charlene M. Czerniak, University of Toledo

Promoting Conceptual Change Using an Inquiry-Based Professional Development with In-Service Preschool Teachers

Mandy M. Smith, The Ohio State University, smith.7810@osu.edu
Heather L. Miller, The Ohio State University
Kathy C. Trundle, Ohio State University
Mesut Sackes, Balikesir University

Towards a Conceptualisation of the Application of Dramatic Approaches to Support Successful Learning in Science

Deb J. McGregor, University of Wolverhampton,
debsmcgregor@gmail.com

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies

Context and Teacher Influence
2:15pm-3:45pm, Pelican Room

Presider:

Todd Hunter, University of Texas at Austin

STEM Integration: Opportunities for Using Imagination and Creativity to Apply STEM Knowledge in Life Science

Hui-Hui Wang, University of Minnesota, wangx773@umn.edu
Gillian Roehrig, University of Minnesota
Tamara J. Moore, University of Minnesota

The Wicked Problem of Multimedia Simulation Integration: A Case from High School Chemistry

Catherine E. Milne, New York University, cem4@nyu.edu

Jan Plass, NYU

Bruce Homer, Graduate Center, City University of New York

Trace Jordan, NYU

Ruth Schwartz, New York University

Steve Yavner, NYU

Mubina Kahn, NYU

Yolanta Kornak, CUNY

Meagan Bromley, NYU

Anna G. Brady, New York University

The Status of Secondary Science Teaching: Factors that Predict Teachers' Practice

Patrick S. Smith, Horizon Research, Inc.,

ssmith62@horizon-research.com

Michele M. Nelson, Horizon Research, Inc.

Peggy Trygstad, Horizon Research, Inc.

Eric R. Banilower, Horizon Research, Inc.

Epistemic Network Analysis of High and Low Innovators in High School Science Classrooms

Elizabeth A. Bagley, University of Illinois at Urbana-Champaign, elizabeth.a.bagley@gmail.com

Anita M. Martin, University of Illinois

Janet Gaffney, University of Illinois at Urbana-Champaign

Raymond Price, University of Illinois at Urbana-Champaign

Fouad Abd-El-Khalick, University of Illinois at Urbana-Champaign

Strand 5: College Science Teaching and Learning (Grades 13-20)

Community Learning in Science Education

2:15pm-3:45pm, Parrot Room

Presider:

Carrie J. Boyce

Undergraduates' Perceived Gains from Participating in Science Education Outreach Programs

Stacey Carpenter, University Of California At Santa Barbara,

scarpenter@education.ucsb.edu

Danielle B. Harlow, University Of California At Santa Barbara

Building Communities of Practice: A K-20 STEM Professional Development Effort

Shelly Micham, University of Cincinnati, s_micham@yahoo.com

Kathie Maynard, University Of Cincinnati

A Physics Education Community of Practice Implementing Innovation

Patrick J. Enderle, The Florida State University, pje07@my.fsu.edu

Sherry A. Southerland, Florida State University

Strand 6: Science Learning in Informal Contexts

Effective Facilitation and Pedagogy for Out-of-School Time Experiences

2:15pm-3:45pm, Sea Gull Room

Presider:

Maritza Macdonald

The Nature of Teaching in Nature: Pedagogical Content Knowledge in the Outdoors

Tali Tal, Technion, rtal@cc.technion.ac.il

Nirit Lavie-Alon, Israel Institute of Technology

Orly Morag, Technion - Israel Institute of Technology

Mentor Vision and Student Behavior: A Case Study of Two Robotics Teams

Nathan R. Dolenc, University of Virginia, nrd3fp@virginia.edu

Robert H. Tai, University of Virginia

Informal Science Educators' Views of Science Teaching and Learning: A Case Study

Marc Behrendt, Ohio University, fossilprep@aol.com

Danielle E. Dani, Ohio University

Strand 7: Pre-service Science Teacher Education

Science Teaching Efficacy

2:15pm-3:45pm, Río Mar Salon 9

Presider:

Jale Ercan

Pre-Service Teachers' Understanding and Perceptions of Science Inquiry and Self-Efficacy

Cathy Northcutt, Western Michigan University,

cathy.k.northcutt@wmich.edu

Renee S. Schwartz, Western Michigan University

Exploring Preservice Elementary Teachers' Teaching Efficacy and Classroom Teaching in Science

Sanghee Choi, University of North Georgia, sc1122@att.net

Exploring Science Teaching Efficacy of Early Childhood Majors in a Mixed-Reality Virtual Classroom

Nazan U. Bautista, Miami University, uludagn@muohio.edu

Effects of Pre-Service Science Teachers' Tutoring Experiences in Introductory Physics: Teachers' Self-Efficacy, Teaching Strategies, and Careers as Science Teachers

Jung Sook Yoo, Ewha Womans University, jsyoo@ewhain.net

Shin Young Lee, Ewha University

Kevin Insik Hahn, Ewha Womans University

Strand 8: In-service Science Teacher Education

Promoting Change in Beliefs and Practice

2:15pm-3:45pm, Río Mar Salon 4

President:

Dionysius T. Gnanakkan

The Impact of a Higher Education Summer Internship Program on K-12 Science Teachers

Jeremy Lingle, Georgia Institute of Technology, jeremy.lingle@ceismc.gatech.edu

Meltem Alemdar, Georgia institute of technology

Jessica Gale, Georgia Institute of Technology - CEISM

Biology Teachers' Beliefs About Teaching and Learning and the Consistency with their Classroom Practices

Claudia Vergara, Illinois Institute of Technology & Facultad de Filosofía y Humanidades, Universidad Alberto Hurtado, Santiago, Chile, claudia.vergara12@gmail.com

Norman G. Lederman, Illinois Institute of Technology

Hernan Cofre, Illinois Institute of Technology & Universidad de Santiago de Chile, Santiago Chile

Variations in Secondary Biology Teachers Transfer of Content and Teaching Strategies from Institute to Classroom

Phyllis Balcerzak, Washington University in St. Louis, pbalcerz@wustl.edu

Victoria May, Washington University in St. Louis

Rachel Ruggirello, Washington University in St. Louis

Investigating what Pedagogical Practices Persist when Professional Learning Institutes End

Lori Rubino-Hare, Northern Arizona University, lori.hare@nau.edu

Jennifer Claesgens, Northern Arizona University

Nena Bloom, Northern Arizona University

Kristi Fredrickson, Northern Arizona University

Carol Henderson-Dahms, Southwest Evaluation Research

James C. Sample, Northern Arizona University

Strand 9: Reflective Practice

Symposium - The Next Generation of Science Education Research: The Importance of Collaboration and Interdisciplinary Research Agendas

2:15pm-3:45pm, Heron Room

Discussant:

Angela Calabrese-Barton, Michigan State University, acb@msu.edu

Presenters:

Julie A. Luft, University of Georgia, jaluft@uga.edu

Takumi Sato, Michigan State University

Felicia M. Mensah, Teachers College, Columbia University

Amelia W. Gotwals, Michigan State University

Hui Jin, Ohio State University

Edna Tan, University of North Carolina at Greensboro

Strand 10: Curriculum, Evaluation, and Assessment

Related Paper Set - Exploring Next Generation Curriculum Models Implementing the Vision in the NRC Framework and NGSS

2:15pm-3:45pm, San Cristobal

A School District-University Partnership for Enhancing Elementary Science Teaching and Learning

Nancy Vye, University of Washington, nancyvye@wu.washington.edu

Angie DiLoreto, Bellevue School District

A Cultural and Cognitive Model for High School Biology Course Development and Implementation

Katie Van Horne, University Of Washington, katievh@uw.edu

Leah A. Bricker, University of Washington

Philip L. Bell, University of Washington

Navigating Novel Problem-Based Pedagogy and Practice: Science Teachers Connecting Problem-Based Science to Students and Standards

Elizabeth Wright, University of Washington, cawright@uw.edu

Paul Sutton

Andrew W. Shouse, University of Washington

Bill Palmer, Sammamish High School

Suzanne Reeve, Sammamish High School

Deep in Science: Deep, Experiential, and Engaging Practices in AP Environmental Science

Diem Nguyen, University of Washington, diem9@u.washington.edu

Lisé Whitfield, University of Washington

Strand 10: Curriculum, Evaluation, and Assessment

New Instruments and Approaches for Assessing Affective and Behavioral Variables for Students and Teachers

2:15pm-3:45pm, Río Mar Salon 2

Presider:

Sarah A. Haines

A Review of STEM Research Instruments for Assessing Teacher Practices, PCK, and Content Knowledge

Daphne D. Minner, Abt Associates, daphne_minner@abtassoc.com
Alina Martinez, Abt Associates

Development, Validation and Use of New Instrumentation for Assessing Student Interest in Science

Morgan L. Presley, University of Missouri, mlp446@mail.missouri.edu
Troy D. Sadler, University of Missouri
William L. Romine, University of Missouri

Examining Fidelity Through Two Lenses: Teachers' Implementation of a Year-Long Curriculum In 9th Grade Physics

Deborah L. Hanuscin, University of Missouri, hanuscind@missouri.edu
Carina Rebello, University of Missouri
Somnath Sinha, University of Missouri
Ya-Wen Cheng, University of Missouri
Nilay Muslu, University of Missouri
Jaimie Foulk, University of Missouri
Meera Chandrasekhar, University of Missouri

The Development of the STEM Career Interest Surveys (STEM-CIS)

Meredith Kier, North Carolina State University, mgweaver@ncsu.edu
Margaret R. Blanchard, North Carolina State University
Jason W. Osborne, Old Dominion University
Jennifer Albert, NC State University

Strand 11: Cultural, Social, and Gender Issues

Worldview of Science

2:15pm-3:45pm, Río Mar Salon 8

Presider:

Katherine A. Welsh

Translanguaging Practices and Language Ideologies in Puerto Rican University Science Education

Catherine M. Mazak, University of Puerto Rico Mayaguez, catherine.mazak@upr.edu

Scientific Literacy and Curricular Goals in Contemporary East Africa

Nicole Beeman-Cadwallader, Indiana University, nbeeman@uemail.iu.edu
Gayle A. Buck, Indiana University

Loving Perception, Loving Playfulness and "World"-Traveling in High School Science

Jean Rockford Aguilar-Valdez, University of North Carolina, Greensboro, msrockford@gmail.com

"Step Up and be Parents!" Science Teachers' Expectations for Family Involvement for Latino/a ELL Middle School Students

Kathryn Scantlebury, University of Delaware, kscantle@udel.edu
Beth A. Wassell, Rowan University
Sarah Braden, University of Utah

Strand 12: Educational Technology

Curriculum, Design and Development

2:15pm-3:45pm, Caribbean Salon 1

Presider:

Virginia W. Snodgrass Rangel

A Randomized Trial of Open Source STEM Education Software (Smartgraphs)

Rachel E. Kay, Concord Consortium, rkay@concord.org
Andrew Zucker, Concord Consortium
Carolyn Staudt, Concord Consortium

Addressing Environmental Issues through Social Networking Technologies and Media Design Projects

Engin Karahan, University of Minnesota, kara0210@umn.edu
Gillian Roehrig, University of Minnesota

Knowledge Organization and Collaborative Argumentation: A New Online Platform and Two Illustrative Cases

Bahadır Namdar, University of Georgia, baha@uga.edu
Ji Shen, University of Georgia

The Use of Cloud Applications for Identifying 21st Century Skills In STEM Education

Sigal Morad, Beitber Academic College, sigalm@beitber.ac.il
Miri Barak, Technion, Israel Institute of Technology

Strand 13: History, Philosophy, and Sociology of Science

Nature of Science: We Know the Past, but What About the Future?

2:15pm-3:45pm, El Morro 1 & 2

Presiders:

Catherine M. Koehler, Southern Connecticut State University

Valarie L. Akerson, Indiana University

Presenters:

Norman G. Lederman, Illinois Institute of Technology

Michael Matthews, University of New South Wales

William McComas, University of Arkansas

Fouad Abd-El-Khalick, University of Illinois

Christine V. McDonald, Griffith University

Ian Binns, University of North Carolina, Charlotte

Strand 14: Environmental Education

Out-of-Classroom Contexts for Environmental Education

2:15pm-3:45pm, Río Mar Salon 7

Presider:

Jennifer Adams

Families' Science Conversations at a Nature Center: Prior Learning Experiences as Shapers of New Knowledge

Lucy R. McClain, Penn State University, lbr118@gmail.com

Heather T. Zimmerman, Pennsylvania State University

The Role of Contact with Nature in Students' Emotional Well-Being: Implications for Education

Carolina Castano, Australian Catholic University,

carolina.rodriguez@acu.edu.au

Zoo Conservation Messages: How do Visitors to Zoos Interpret the Messages it Intends to Convey

Chagit E. Tishler, Ben-Gurion University of the Negev,

tishler@post.bgu.ac.il

Orit Ben-Zvi Assaraf

Michael N. Fried

Strand 15: Policy

Science Education and the STEM Pipeline

2:15pm-3:45pm, Río Mar Salon 10

Presider:

Sharon J. Lynch, George Washington University

Do Preparation and Inspiration During High School Increase the Likelihood of Pursuing a STEM Degree?

Martha Bottia, University of North Carolina at Charlotte,

mbottia@uncc.edu

Roslyn A. Mickelson, UNC Charlotte

Elizabeth Stearns, UNC Charlotte

Ashley Parker, UNC Charlotte

Stephanie Moller, UNC Charlotte

The Achievement Gap in Science: A Turkish Perspective

Mustafa S. Topcu, Mugla Sitki Kocman University,

msamitopcu@gmail.com

Charting Community College Pathways in System-Wide Efforts to Promote College Persistence and Attainment in STEM

Felisha A. Herrera, University of California, Los Angeles,

fherrer1@gmail.com

Defining the U.S. Federal Perspective on STEM with a Process Model

Kent J. Crippen, University of Florida, kcrippen@coe.ufl.edu

Julie C. Brown, University of Florida

Kristen Appleby, University of Florida

Rich Busi, University of Florida

Derya Evran, University of Florida

Cheryl A. McLaughlin, University of Florida

Matthew Peace, Florida Gateway College

Ali Temurtas, University of Florida

Concurrent Session #9

4:00pm – 5:30pm

Publications Advisory Committee Sponsored Session

Celebrating Fifty years of JRST: Editors' Perspectives on its Past, Present, and Future

4:00pm-5:30pm, Caribbean Salon 1

Presiders:

Carolyn S. Wallace, Indiana State University

Danielle J. Ford, University of Delaware

Presenters:

William C. Kyle, Jr., University of Missouri - St. Louis

Angela Calabrese-Barton, Michigan State University

Joseph S. Krajcik, Michigan State University

J. Randy McGinnis, University of Maryland

Dale R. Baker, Teachers College

Charles W. Anderson, Michigan State University

Ron G. Good, LSU

James A. Shymansky, University of Missouri – St. Louis

Mike D. Piburn, Arizona State University

Research Interest Group CADASE & Equity and Ethics Committee Sponsored Session

A Response to the Horizon Research Symposium - Unequal Distribution of Resources for K-12 Science Instruction

4:00pm - 5:30pm, Río Mar Salon 8

Presiders:

Felicia M. Mensah, Teachers College, Columbia University,
fm2140@tc.columbia.edu

Jomo W. Mutegi, Indiana University, Indianapolis

Mary M. Atwater, University of Georgia

Presenters:

Pamela Fraser-Abder, New York University

June George, The University of the West Indies

Audre M. Green, University of South Alabama

Peter A. Okebukola, Lagos State University

Meshach B. Ogunniyi, University of the Western Cape

Jerome Shaw, University of California, Santa Cruz

Strand 1: Science Learning, Understanding and Conceptual Change

Structural Features and Characteristics of Physics that Impact Students' Learning

4:00pm-5:30pm, Río Mar Salon 1

Presider:

Knut Neumann

Refinement of Logico-Mathematical Intelligence in the Context of Physics Education

Lina Vinitsky Pinsky, Achva Academic College,
lina.vinitskypinsky@gmail.com

Igal Galili, The Hebrew University of Jerusalem

Investigating Student Mental Models at the Intersection of Mathematical and Physical Reasoning in Science

Savannah E. Lodge-Scharff, University of Maine,
s.lodgescharff@gmail.com

Jonathan Shemwell, University of Maine

Examining the Consistency in Eighth Grade Students' Mental Model Representations about Magnetic Interactions

Tugba Yuksel, Purdue University, tyuksel@purdue.edu

Lynn A. Bryan, Purdue University

Elementary Pre-Service Teachers' Sources of Existing Alternative Conceptions about Weight and Gravity

Rex N. Taibu, Western Michigan University, rex.taibu@wmich.edu

Lloyd M. Mataka, Western Michigan University

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Related Paper Set - The Impact of Classroom Discourse on Engagement in Scientific Practices and Student Learning

4:00pm-5:30pm, Río Mar Salon 10

The Use of Students' Everyday Knowledge and Evidence in Generating Explanations

Mon Lin Ko, Northwestern University,

monlinko2008@u.northwestern.edu

Connecting Students' Everyday Ideas to Scientific Investigations and Explanations

Christina Krist, Northwestern University, ckrist@u.northwestern.edu

Mon Lin Ko, Northwestern University

Using Classroom Discourse to Account for Differences in Written Explanations

Brandy L. Buckingham, Northwestern University,

brandy@u.northwestern.edu

Mon Lin Ko, Northwestern University

The Effect of Teacher Framing on Students' Engagement in Scientific Modeling

Abraham Lo, Northwestern University, alo@u.northwestern.edu

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Intersections among Culture, Cultural Practices, Diversity, and Science Learning

4:00pm-5:30pm, Caribbean Salon 2

Presider:

Mercy Oqunsola-Bandele

Teacher Quality and School Culture: How do Highly-Diverse High Schools Close the Science Achievement Gap?

Carol L. Stuessy, Texas A&M University, c-stuessy@tamu.edu

Dane Bozeman, Texas A & M University

Longitudinal Analysis of Science Program Experiences to Design a Science Partnership Program Model

Megan E. Faurot, Illinois Institute of Technology,

mfaurot@hawk.iit.edu

Norman G. Lederman, Illinois Institute of Technology

Stephen Bartos, Illinois Institute Of Technology

Reshaping Interactions in Urban Science Learning Environments: The Peer Enabled Restructured Classroom

Leslie S. Keiler, The City University of New York,
lkeiler@york.cuny.edu

Sarah Bonner, The City University of New York
Pam Mills, The City University of New York
Linda Gerena, The City University of New York

Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies

Symposium - The Status of Elementary Science Education:
Are We Ready for the Next Generation Science Standards?

4:00-5:30, Río Mar Salon 3

Presenters:

Eric R. Banilower, Horizon Research Inc., erb@horizon-research.com
P. Sean Smith, Horizon Research Inc.
Peggy J. Trygstad, Horizon Research Inc.
Michele M. Nelson, Horizon Research Inc.

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies

Symposium - A Report on the PCK Summit: Current and
Future Research Directions

4:00pm-5:30pm, Pelican Room

Presider:

April L. Gardner, Biological Science Curriculum Study

Presenters:

Julie Gess-Newsome, Willamette University, jgessnew@willamette.edu
Janet Carlson, BSCS
Amanda K. Berry, Monash University
Andreas Borowski, University Duisburg-Essen
Hans E. Fischer, University Duisburg-Essen
Ineke Henze, Radboud University, Nymegen
Sophie Kirschner, University Duisburg-Essen
Elizabeth Mavhunga, University of Witwatersrand
Soonhye Park, University of Iowa

Strand 5: College Science Teaching and Learning (Grades 13-20)

Improving Student Learning in Chemistry

4:00pm-5:30pm, Parrot Room

Presider:

Abdulkadir Demir

Improving Student Understanding of Ionic Compounds with Pogil Instruction

Abdi M. Warfa, University of Minnesota, moham489@umn.edu
James Nyachwaya, University of Minnesota
Gillian Roehrig, University of Minnesota
Jamie L. Schneider, University of Wisconsin River Falls

Exploring Computerized Lexical Analysis to Predict Calibrated Peer Review Ratings of Student Writing in Chemistry

Kevin Haudek, Michigan State University, haudekke@msu.edu
Arlene A. Russell, University of California, Los Angeles
Mark Urban-Lurain, Michigan State University

Developing a Learning Progression on Benefits, Costs, and Risks in Chemical Design

Hannah Sevan, University of Massachusetts Boston,
hannah.sevan@umb.edu
Steven Cullipher, University of Massachusetts Boston
Vicente A. Talanquer, University of Arizona

Strand 5: College Science Teaching and Learning (Grades 13-20)

Argumentation in College Science Teaching

4:00pm-5:30pm, San Cristobal

Presider:

Yasemin Ozdem

Exploring University Students' Understanding of Science Process Skills and Arguments Appeared in Introductory Chemistry Laboratory Reports

Eulsun Seung, Indiana State University, esseung@gmail.com
Aeran Choi, Ewha Womans University
Beverly C. Pestel, Indiana State University

Conceptual Knowledge, Argumentation and Scientific Reasoning Gaps of Low and High Scientific Reasoners in an Argumentation Based Inquiry Instruction

ömer Acar, Kocaeli Üniversitesi, omer.acar@kocaeli.edu.tr
Bruce Patton, The Ohio State University

Exploring the Effects of Scaffolding on College Students' Solutions and Argumentation Quality on Conceptual Physics Problems

Carina M. Rebello, University of Missouri, cp5xc@mail.missouri.edu
Lloyd H. Barrow, University of Missouri

A Comparison of Biology Majors' Written Argumentation Skills across the Curriculum

Melissa Schen, Wright State University, melissa.schen@wright.edu

Strand 6: Science Learning in Informal Contexts

Symposium - Understanding Interactions at Science Centers and Museums - Approaching Sociocultural Perspectives

4:00pm-5:30pm, Sea Gull Room

Presider:

Helene Sorensen, University of Aarhus

Presenters:

Eva Davidsson, Malmö University, eva.davidsson@mah.se

Anders Jakobsson, Malmö University

Doris B. Ash, University of California - Santa Cruz

Jennifer DeWitt, King's College London

Tali Tal, Technion

Strand 7: Pre-service Science Teacher Education

Preservice Teachers' Conceptions and Challenges About Biology Education

4:00pm-5:30pm, Río Mar Salon 9

Presider:

Sarah A. Haines

Without the Light of Evolution: Resistance and Avoidance in Learning to Teach High School Biology

Douglas B. Larkin, Montclair State University,

larkind@mail.montclair.edu

Gail Perry-Ryder, Montclair State University

A Comparison of Elementary Education Major's Acceptance and Understanding of Evolution with Other Majors

Ronald S. Hermann, Towson University, rhermann@towson.edu

Assessing Pre-Service Teachers' Professional Knowledge in Biology: The Project KiL

Jörg Großschedl, University of Kiel, Germany,

grossschedl@ipn.uni-kiel.de

Miriam Waldmann, University of Kiel, Germany

Ingrid Glowinski, University of Kiel, Germany

American, German, Korean, and Indonesian Pre-Service Teachers' Evolutionary Acceptance, Knowledge, and Reasoning Patterns

Ross H. Nehm, The Ohio State University, nehm.1@osu.edu

Minsu Ha, The Ohio State University

Jörg Großschedl, Biology Education, Leibniz Institute for Science and Mathematics Education (IPN), Germany

Ute Harms, Leibniz Institute for Science and Mathematics Education (IPN), Germany

Fennyroshayanti Roshayanti, IKIP PGRI Semarang, Indonesia

Strand 8: In-service Science Teacher Education

The Scaffolding Role of Community in Professional Development

4:00pm-5:30pm, Río Mar Salon 4

Presider:

Italo Testa, University of Federico II Napoli

Science Teachers Difficulties when Dealing with Socio-Scientific Discourse

Italo Testa, University Federico II Napoli, italo@na.infn.it

The Role of Science in Promoting Critical Collegueship in a Mixed-Content Professional Learning Community

Amelia W. Gotwals, Michigan State University, gotwals@msu.edu

Dawnmarie Ezzo, Michigan State University

Increasing Science Achievement in an Urban School District Through Science Teacher Collaborations with Paraprofessionals

Kimberly A. Staples, Kansas State University, kstaples@ksu.edu

Learning about Formative Assessment: Science Teachers' Experiences in a Community-Based Professional Development

Dante Cisterna, Michigan State University, cisterna@msu.edu

Amelia W. Gotwals, Michigan State University

Strand 10: Curriculum, Evaluation, and Assessment

Symposium - PROFILES - Promoting Inquiry-based Science Education in Germany and in Other Countries

4:00pm-5:30pm, Río Mar Salon 2

Discussant:

Wolfgang K. Graeber, Leibniz Institute (IPN), wgraeber@ipn.uni-kiel.de

Presenters:

Claus Bolte, Freie University Berlin

Sabine Streller, Freie Universität Berlin

Theresa Schulte, Freie Universität Berlin

Vincent M. Schneider, Freie Universität Berlin

Tuula Keinonen, University of Eastern Finland

Strand 13: History, Philosophy, and Sociology of Science

Symposium - Promoting Epistemic Practices in the Secondary Science Classroom

4:00pm-5:30pm, El Morro 1 & 2

Presider:

Andri Christodoulou, University of Southampton, a.christodoulou@soton.ac.uk

Maria-Pilar J. Aleixandre, Universidade De Santiago De Compostela

Jonathan F. Osborne, Stanford University

Aybuke Pabuccu, Abant Izzet Baysal University

Sibel Erduran, University of Bristol

Beatriz Crujeiras-Pérez, University of Santiago de Compostela

Jesus Piqueras, Stockholm University

Karim M. Hamza, Stockholm University

Per-Olof Wickman, Stockholm University

Gregory J. Kelly, Penn State University

Strand 13: History, Philosophy, and Sociology of Science

NOS in Elementary and Middle School

4:00pm-5:30pm, Heron Room

Presider:

Christine V. McDonald

Evidence-Based Strategies for Teaching Nature of Science to Young Children

Valarie L. Akerson, Indiana University, vakerson@indiana.edu

Ingrid Weiland, University of Louisville

Khemmawadee Pongsanon, Indiana University

Vanashri Nargund-Joshi, Indiana University, Bloomington

Investigating the Impact of Nature of Technology Instruction in a Middle School Science Course

Jerrid W. Kruse, Drake University, jerridkruse@gmail.com

Teachers' Translation of Nature of Science Views to Instructional Practice

Bridget K. Mulvey, Kent State University, bmulvey@kent.edu

Randy L. Bell, University of Virginia

Teaching Nature of Science and Scientific Inquiry to Diverse Classes of Early Primary Level Students

Judith S. Lederman, Illinois Institute of Technology, ledermanj@iit.edu

Selina Bartels, Illinois Institute Of Technology

Cheng Liu, Beijing Normal University

Juan Jimenez, Illinois Institute of Technology

Strand 14: Environmental Education

Collective Identities and Critical Discourse in Environmental Education

4:00pm-5:30pm, Río Mar Salon 7

Presider:

Anne Kern

Undergraduate Understanding of Climate Change: Influences of Major and Environmental Group Membership on Knowledge Scores

Joanna K. Huxster, University of Delaware, jhuxster@udel.edu

Ximena Uribe-Zarain, University of Delaware

Epistemological Viewpoints and Environmental Awareness: Personal Observation vs. Scientific Theories

Gokhan Ozturk, Texas A&M University, gozturk@tamu.edu

Elif Ozturk, Texas A&M University

"Thank You for Being Republican": Socio-Political Influences on Students' Learning of Climate Change Science

Elizabeth Walsh, San Jose State University, elizabeth.walsh@sjsu.edu

Blakely Tsurusaki, University Of Washington

Rethinking "Good" Citizenship for Environmental Education

Alexandra Dimick, University at Buffalo, schindel.dimick@gmail.com

Evening/Social Events

Membership and Elections Committee Sponsored Session

Early Career and Junior Faculty Early Career Discussion

This session is particularly designed for the early career, junior faculty who need support during the first years of their academic career.

The focus will be a panel discussion with experienced faculty who can guide junior faculty through important issues that pertain to the tenure process and other issues. Discussion topics include, but are not limited to: publications, research in the new position, collaboration with different colleges within the university setting, teaching loads, the tenure and promotion process, etc. We invite all junior faculty interested in this topic to join us.

5:45pm – 6:45pm, Caribbean Salon 1

Presiders:

Yehudit Judy Dori, Technion - Israel Institute of Technology
Marcelle Siegel, University of Missouri

JRST Editorial Board Meeting

6:00pm – 7:30pm, Caribbean Salon 3

Social

JRST at 50: A Tropical Silver Celebration

8:00pm – 10:30pm, Vista Verde Garden

All are Welcome – Desserts, Cash Bar, & Entertainment

Tuesday, April 9, 2013

Conference Registration

7:00am – 12:00pm, Río Mar Atrium

Strand Meetings

7:00am – 8:15am

Strand 1: Science Learning, Understanding and Conceptual Change
Meeting—7:00am – 8:15am, Río Mar Salon 1

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Meeting—7:00am – 8:15am, Río Mar Salon 2

Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies
Meeting—7:00am – 8:15am, Río Mar Salon 3

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies
Meeting—7:00am – 8:15am, Río Mar Salon 4

Strand 5: College Science Teaching and Learning (Grades 13-20)
Meeting—7:00am – 8:15am, Caribbean Salon 1

Strand 6: Science Learning in Informal Contexts
Meeting—7:00am – 8:15am, Caribbean Salon 2

Strand 7: Pre-service Science Teacher Education
Meeting—7:00am – 8:15am, Río Mar Salon 7

Strand 8: In-service Science Teacher Education
Meeting—7:00am – 8:15am, Río Mar Salon 8

Strand 9: Reflective Practice
Meeting—7:00am – 8:15am, Río Mar Salon 9

Strand 10: Curriculum, Evaluation, and Assessment
Meeting—7:00am – 8:15am, Río Mar Salon 10

Strand 11: Cultural, Social, and Gender Issues
Meeting—7:00am – 8:15am, Parrot Room

Strand 12: Educational Technology
Meeting—7:00am – 8:15am, Pelican Room

Strand 13: History, Philosophy, and Sociology of Science
Meeting—7:00am – 8:15am, Sea Gull Room

Strand 14: Environmental Education
Meeting—7:00am – 8:15am, Heron Room

Strand 15: Policy
Meeting—7:00am – 8:15am, El Morro 1 & 2

Concurrent Session #10

8:30am – 10:00am

Awards Committee Sponsored Session
Symposium - Distinguished Contributions in Research
8:30am-10:00am, Caribbean Salon 1

President:

Jonathan Osborne, Stanford University

Presenters:

Reinders Duit, University of Kiel

Charles W. Anderson, Michigan State University

Larry Yore, University of Victoria

Strand 1: Science Learning, Understanding and Conceptual Change

Identifying Students' Conceptualizations and Conceptual Change

8:30am-10:00am, Río Mar Salon 1

President:

Alla Keselman

How Do Deserts Form? Selected Results of an Empirical Study about Preconceptions of 12- And 13-Year-Old Students in Germany

Jan Christoph C. Schubert, WWU Muenster, jcschubert@uni-muenster.de

Secondary School Students' Explanations on Anomalous Data

Tobias Ludwig, Humboldt University of Berlin,

tobias.ludwig@physik.hu-berlin.de

Burkhard Priemer, Humboldt University of Berlin

The Interaction Between Context and Young Children's Alternative Conceptions

Uyen A. Ly, UC Berkeley, emailuyenly@gmail.com

Can Change in Facial Expression be Used as an Indicator of Conceptual Change?

Mei-Hung Chiu, National Taiwan Normal University,
mhchiu@ntnu.edu.tw

Chin-Cheng Chou, Hungkuang University

Wen-Lung WU, National Taiwan Normal University

Hongming Liaw, National Taiwan Normal University

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Models of Engagement Related to Science Learning and Teaching

8:30am-10:00am, Río Mar Salon 10

Presider:

Ajay Sharma

Using Mixed Methods to Exploring the Nature of High School Student Engagement with Science and Technology: Resulting Insights and Conundrums

Jennifer Hope, McKendree University, jmhope@mckendree.edu

Photonarratives in an Online Master's Course: A Viable Way to Enhance Teacher Reflection and Build Community?

Lauren Madden, The College of New Jersey, maddenl@tcnj.edu

Gail M. Jones, North Carolina State University

Margaret R. Blanchard, North Carolina State University

Designing Integrated Learning Environments to Promote Engineering Practices

Rob Rouse, Vanderbilt University, rob.rouse@vanderbilt.edu

Student Navigation of Design-Based STEM Activities

Stephanie Hathcock, Old Dominion University, shath005@odu.edu

Daniel L. Dickerson, Old Dominion University

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Argumentation, Reasoning, and Explanation within Science Learning

8:30am-10:00am, Caribbean Salon 2

Presider:

Rainer Wackermann

Tracing Elementary Students' Use of Talk and Writing for Knowledge Development through Argument-Based Inquiry

Ying-Chih Chen, University of Minnesota, chen2719@umn.edu

Soonhye Park, University Of Iowa

Brian M. Hand, University of Iowa

Charting Mechanistic Reasoning Across Aquatic Ecosystems

Suparna Sinha, Rutgers University, suparna.sinha@gse.rutgers.edu

Cindy E. Hmelo-Silver, Rutgers University

Catherine Eberbach, Rutgers University

Rebecca Jordan, Rutgers University

Wesley R. Brooks, Rutgers University

Yawen Yu, Rutgers

Crina Damsa, University of Oslo

Adjusting Claims as New Evidence Emerges: Do Students Incorporate New Information into their Scientific Explanations?

Ann M. Novak, Greenhills School, anovak@greenhillsschool.org

David F. Treagust, Curtin University

Year 2 Longitudinal Study of Effectual Reasoning Scores of High and Low Innovators

Anita M. Martin, University Of Illinois, abmartin@illinois.edu

Raymond Price, University of Illinois at Urbana-Champaign

Fouad Abd-El-Khalick, University of Illinois at Urbana-Champaign

4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies

Investigating Teaching and Textbooks in Secondary School

8:30am-10:00am, San Cristobal

Presider:

Saouma B. Boujaoude, American University of Beirut

Assessing the Impact Participation in Science Journalism has on Scientific Literacy among High School Students

Cathy Farrar, University of Missouri-St. Louis, farrarcath@gmail.com

Analysis of the Chemical Representations in Secondary Chemistry Textbooks

Saadeddine Shehab, International College, Beirut, Lebanon,

sss21@aub.edu.lb

Saouma B. Boujaoude, American University of Beirut

A Case Study Demonstrating the Use of Concept Inventories in the Secondary Biology Classroom

Kim Murie, University of Arkansas, ksj002@uark.edu

Ryan Walker, University of Arkansas

Feng Jiang, New York University

Rebecca M. Price, UWB

Kathryn E. Perez, University of Wisconsin at La Crosse

Investigating How Teachers Implement Model-Based Teaching

Christopher Bogiages, University of South Carolina,

cbogiages@gmail.com

Understanding the Language of Middle-School Science: Comparing Discourse-Marker Usage in Science and Social Studies Textbooks

Diego X. Roman, Stanford University, dxroman@stanford.edu
 Stephanie I. Hironaka, Stanford University
 Hannah Rohde, University of Edinburgh

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies

Effect of Teachers' Knowledge, Dispositions, and Beliefs on Teaching

8:30am-10:00am, Pelican Room

The Knowledge Needed for Teaching Science: A Study of in and Out-of-Field Science Teachers

Kathleen Hill, Arizona State University, kathyhill@asu.edu
 Charles Weeks, Arizona State University
 Sara Raven, University of Georgia

Exceptional Science Teaching in Poor Schools: Exploring Dispositions through Narratives of Effectiveness

Annemarie Hattingh, University of Cape Town, annemarie.hattingh@uct.ac.za

A Science Teacher's Beliefs About NOS - Going Behind the Myths of Positivism

Birgitte Bjonness, Norwegian university of life sciences, birgitte.bjonness@umb.no
 Erik Knain, Norwegian university of life sciences

Reconstruction of Teachers' Strategies to Embed Practical Work into the Flow of Physics Classroom Instruction

Maximilian Barth, Institute for Mathematics and Physics Education, barth@idmp.uni-hannover.de
 Gunnar Friege, Institute for Mathematics and Physics Education

Examining the Content Knowledge of Beginning Science Teachers through Concept Maps: An Exploratory Study

Kathleen M. Hill, Arizona State University, kathyhill@asu.edu
 Charles B. Weeks, Arizona State University
 Jonah B. Firestone, Washington State University-Tricities
 Julie A. Luft, University of Georgia

Strand 5: College Science Teaching and Learning (Grades 13-20)

Improving Student Learning in Biology

8:30am-10:00am, Parrot Room

Presider:

Leslie S. Jones

Using Student Motivation to Construct Collaborative Groups in a Non-Majors Biology Course: Impacts on Critical Learning Outcomes

Grant E. Gardner, East Carolina University, gardnerg@ecu.edu
 Kristi Walters, East Carolina University

Comparing Formative Feedback Reports: Human and Machine Analysis of Constructed Response Questions in Biology

Michele M. Weston, Michigan State University, westonmi@msu.edu
 Joyce M. Parker, Michigan State University
 Mark Urban-Lurain, Michigan State University

Peer Led Team Learning in Introductory Biology: Effects on Critical Thinking Skills

Julia J. Snyder, Syracuse University, jjseymou@syr.edu
 Jason R. Wiles, Syracuse University

Learning Inquiry and Nature of Science Through an Open Investigation in a Field-Biology Course

Maya R. Patel, Ithaca College, mpatel@ithaca.edu
 Daniel S. Kjar, Elmira College

Strand 6: Science Learning in Informal Contexts

Strand Sponsored Symposium - Designing New Bridges between Informal and Formal Science Learning and Why STEM Education Needs Them

8:30am-10:00am, Sea Gull Room

Discussant:

Ellen McCallie, National Science Foundation

Presider:

Philip Bell, University of Washington
 David E. Kanter, New York Hall of Science
 Shirin Vossoughi, Exploratorium
 Elliot Washor, Big Picture Learning
 Steven Zipkes, Manor New Technology High School

Strand 7: Pre-service Science Teacher Education

Engagement into the World of Teaching Profession

8:30am-10:00am, Río Mar Salon 9**Presider:**

Adem Tasdemir, Virginia Commonwealth University

Science Education Internships for the Professional Development of Pre-Service Teachers: Affordances and ConstraintsAndrea G. Van Duzor, Chicago State University, agay@csu.edu

Mel Sabella, Chicago State University

Engaging Pre-Service Teachers in a Community of Practice Through Socio-Scientific InquiryKristin L. Cook, Bellarmine University, kcook@bellarmine.edu**Preservice Science Teachers Sharing of Knowledge and Understanding in a Journal Club**

Karen A. Tallman, University of Massachusetts Amherst,

kmtallman@comcast.net

Allan Feldman, University of South Florida

Preparing Secondary Science Teachers to Engage Students in Scientific Explanations: A Practice-Based ApproachKasey McCall, University Of Michigan, kaseyl@umich.edu

Deborah Peek-Brown, University of Michigan

R. C. Dershimer, University of Michigan

Strand 8: In-service Science Teacher Education

Reconciling with New Directions of Educational Reform

8:30am-10:00am, Río Mar Salon 4**Presider:**

Miia Rannikmae

Teachers' Experiences with Reform-Based Instructional Resources: Coming to Terms with New Priorities for Science LearningShirly Avargil, University of Maine, shirly.avargil@maine.edu

Jonathan T. Shemwell, University of Maine

Daniel K. Capps, University of Maine

Bill Zoellick, Schoodic Education & Research Center Institute

Preparing for NGSS: Professional Development Model Based on Lessons Learned from Previous Standards Implementation EffortsMarion Reeves, Georgia State University, marion-reeves@comcast.net**Quebec's Problem-Based Learning Science Reform: A New Policy and its Effects on the Teaching Practice**Jessica L. Godin, McGill, godin.jessica@gmail.com**Teachers' Understandings of Inquiry and Use of Scientific Practices: A Survey of NSTA****Conference Attendees**Ashley M. Young, University of Maine, a.may.young@gmail.com

Daniel Capps, University of Maine

Craig A. Mason, University of Maine

Strand 10: Curriculum, Evaluation, and Assessment

Assessment and Observation Development and Validation Studies

8:30am-10:00am, Río Mar Salon 2**Presider:**

Daphne D. Minner

The Difficulty of Solving Physics Tasks in Realistic Stories

Alexandra Dorschu, University Duisburg-Essen,

alexandra.dorschu@uni-due.de

Heiko Krabbe, University Duisburg-Essen

Hans E. Fischer, University Duisburg-Essen

Alexander Kauertz, University Koblenz Landau

Assessing the Role of Curriculum Coherence in Student Learning about Energy

David L. Fortus, Weizmann Institute of Science,

david.fortus@weizmann.ac.il

LeeAnn M. Sutherland, University of Michigan

Brian J. Reiser, Northwestern University

Joseph S. Krajcik, Michigan State University

Detecting Differential Item Functioning in a Brief Electricity and Magnetism Assessment (BEMA)Lin Ding, The Ohio State University, ding.65@osu.edu**The BEST Observation Protocol: Looking at Next Generation Science Standards' Crosscutting Concepts in the Classroom**Abigail J. Levy, Education Development Center, Inc., alevy@edc.org

Allison Scheff, University of Massachusetts Boston

Robert F. Chen, University of Massachusetts Boston

Pamela Pelletier, Boston Public Schools

Erica T. Fields, Education Development Center, Inc.

Strand 11: Cultural, Social, and Gender Issues

Gender and Science: The Impact of Museums, Attitudes, and Perceived Success

8:30am-10:00am, Río Mar Salon 8**Presider:**

Vanessa Wyss, Ball State University

Gender Differences: Development of Sixth Grade Students' Geometric Spatial Visualization within an

Earth/Space Unit

Christa Jackson, University of Kentucky, christa.jackson@uky.edu
 Jennifer A. Wilhelm, University of Kentucky
 Amber Sullivan, University of Kentucky
 Jeffrey Peake, University of Kentucky
 Ronald Wilhelm, University of Kentucky

Strengthening from the Outside In: Promoting Success for Women of Color in Physics

Apriel K. Hodari, Council for Opportunity in Education, apriel.hodari@coenet.us
 Rachel Kachchaf, TERC
 Lily Ko, TERC
 Maria Ong, TERC

Beyond Biology: Altruism and the Impact on Choosing STEM across Gender

Vanessa Wyss, Ball State University, vwys@ballstate.edu
 James Jones, Ball State University
 Elena Polush, Ball State University

Museum Programs and their Impact on Girl's Interest, Motivation and Ability to Persist in Science

Jennifer Adams, Brooklyn College- CUNY, jadams@brooklyn.cuny.edu
 Alix Cotumaccio, American Museum of Natural History
 Preeti Gupta, American Museum of Natural History

Body Worlds as Heterotopia: Unspoken Power Relations in the Science Centre

Michelle M. Dubek, OISE/University of Toronto, michelle.dubek@uoit.ca
 Susan Jagger, OISE/University of Toronto
 Erminia G. Pedretti, University Of Toronto

Strand 12: Educational Technology

Games, Simulations and Visualizations

8:30am-10:00am, Río Mar Salon 3

Presider:

Miri Barak, Technion – Israel Institute of Technology

The Evidence Game -- Introducing Scientific Argumentation to Middle School Science Students

James D. Ellis, The University of Kansas, jdellis@ku.edu

Visualizations on Physics and Chemistry Lessons: Potentialities for the Development of Competences

Dulce C. Pereira, Escola Secundária Anselmo de Andrade, dulce.campos1@sapo.pt
 Luísa M. Lourenço, Professor
 Mónica Baptista, Instituto De Educação Da Universidade De Lisboa

In-Game and Classroom Supports around a Concept-Integrated Digital Physics Game in Middle School Science Classrooms

Phillip M. Stewart, Teachers College Columbia University, pstewart@gmail.com
 Ann E. Rivet, Teachers College Columbia University

Interface of Creativity, Fluency and Technology Using the Design of Science Serious Educational Games

Richard L. Lamb, George Mason University, lamb9137@gmail.com
 Len Annetta, George Mason University
 David B. Vallett, George Mason University

Strand 13: History, Philosophy, and Sociology of Science

Subject Matter & Evolution

8:30am-10:00am, Heron Room

Presider:

Dionysius T. Gnanakkan

Physics Teacher Use of the History of Science

Charles Winrich, Babson College, cwinrich@bu.edu
 Peter S. Garik, Boston University
 Luciana Garbayo, University of Texas-El Paso
 Yann Benetreau-Dupin, University of Western Ontario
 Andrew Duffy, Boston University
 Nicholas Gross, Boston University
 Manher Jariwala, Boston University

Student Ontological Position Exposes Plagiaristic Knowledge on Cognition of Human Origins

Jeremy A. Ervin, Richard Stockton College of NJ, ervinj@stockton.edu

The Gaene--Generalized Acceptance of Evolution Evaluation: Development of a New Measure of Evolution Acceptance

Mike U. Smith, Mercer University School Of Medicine, smith_mu@mercer.edu
 Scott W. Snyder, University of Alabama at Birmingham
 Randolph S. Devereaux, Mercer University School Of Medicine

From Nature of Science Ideas into a Nature of Science Curriculum

Hagop A. Yacoubian, Haigazian University, Lebanon, hagop.yacoubian@haigazian.edu.lb

Strand 14: Environmental Education

How Places and Cultures Shape Science Teaching and Learning on Three Islands

8:30am-10:00am, El Morro 1 & 2

Presiders:

Pauline W. Chinn, University of Hawaii - Manoa

Alyson Barrows, Lihikai Elementary School, University of Hawaii

Matthew Kanemoto, Kahuku Intermediate and High School,

University of Hawaii

Sabra Kauka, Kauai District Hawaiian Studies Coordinator,

University of Hawaii

Kellie Kong, University Of Hawaii

Gandharva M. Ross, Molokai High School, University Of Hawaii

Steven Mcgee, North Western University

Chiung-Fen Yen, Providence University

Huihui Kanahale-Mossman, Ka Umeke Kaeo, University of Hawaii

Yeong-Choy Kam, Tunghai University, Taiwan

Strand 14: Environmental Education

Reasoning and Creative Methods to Research and Teach in Environmental Education

8:30am-10:00am, Canary Room

Pre-Service Science Teachers' Informal Reasoning in the Context of Nuclear Power Plant Construction

Nilay Ozturk, Middle East Technical University, onilay@metu.edu.tr

Ozgul Yilmaz-Tuzun, Middle East Technical University

Environmental Moral Reasoning Patterns of Pre-Service Science Teachers and Correlated Factors

Busra Tuncay, Giresun University, Middle East Technical University,

tbusra@metu.edu.tr

Ozgul Yilmaz-Tuzun, Middle East Technical University

Gaye Teksoz, Middle East Technical University

Reasoning About Climate: The Role of Scientific Reasoning in Climate Education

Shiyu Liu, University of Minnesota, liux0631@umn.edu

Gillian Roehrig, University of Minnesota

Keisha Varma, University of Minnesota

Devarati Bhattacharya, University of Minnesota, Minneapolis

Pre-Service Teachers' Mental Models of the Environment: A Turkish Context

Harika Ozge Arslan, Yuzuncu Yil University, Middle East Technical

University, harika@metu.edu.tr

Christine Moseley, University of Texas at San Antonio

Omer Geban, Middle East Technical University

Strand 14: Environmental Education

Identity, Situated Practices, and Sociocultural Learning in Environmental Education

8:30am-10:00am, Río Mar Salon 7

Time-Space Configurations of Learning and Identity Trajectories: Stories from Projects in Ecology and Gardening

Jrene Rahm, Université de Montreal, jrene.rahm@umontreal.ca

Positional Identities and Environmental Contexts for Learning in an After School STEM Club

Carol B. Brandt, Temple University, carol.brandt@temple.edu

Frogs Can't Give You Warts, But They Can Make You Brave: Identity Boundary-Work in Field Science

Heidi B. Carlone, University of North Carolina at Greensboro,

hbcarlone@uncg.edu

Lacey Huffling, University of North Carolina at Greensboro

Theresa A. Hegedus, University of North Carolina at Greensboro

Terry Tomasek, Elon University

Catherine E. Matthews, University of North Carolina at Greensboro

An Exploration of High School Students' Environmental Identities in a Project-Based**Conservation Program**

Mele Wheaton, Stanford University, melwheat@gmail.com

My Puget Sound: Students' Positional Identities, Lived Worlds, And Learning In Environmental Education

Blakely Tsurusaki, University Of Washington,

btsuru@u.washington.edu

Carrie T. Tzou, University of Washington

Concurrent Session #11

10:15am – 11:45am

Strand 1: Science Learning, Understanding and Conceptual Change

Examining Strategies, Knowledge Formation and Use, and Self Regulation Processes during Problem-Solving

10:15am-11:45am, Río Mar Salon 1

Presider:

Cesar Delgado

Do Students' Eye Movements Reveal their Strategies for Solving Physics Problems?

Elizabeth N. Olson, Union University, besty.olson@my.uu.edu

Bashirah Ibrahim, Kansas State University

Adrian C. Madsen, Kansas State University

Amy S. Rouinfar, Kansas State University

N. Sanjay Rebello, Kansas State University

Comparison of the Knowledge Structures and Problem Solving Ability of Advanced Placement Physics Students in a Traditional Course and a Modeling Instruction Course – An Exploration

Dan Malone, Fox Chapel Area High School, dan_malone@fcasd.edu
Kathy L. Malone, Einstein Fellow at National Science Foundation

Influences on the Structure of Scientific Problem Solving Processes

Desiree Heine, University Koblenz-Landau, Institut of science education, heine@uni-landau.de
Alexander Kauertz, University Koblenz-Landau

How do High School Students Approach Ill-Defined Physics Problems?

Jeff Milbourne, North Carolina State University, milbourne@ncssm.edu
Eric N. Wiebe, North Carolina State University

Strand 1: Science Learning, Understanding and Conceptual Change

Symposium - Designing for the Teaching and Learning of Evolution in Elementary & Middle School

10:15am-11:45am, El Morro 1 & 2

Presenters:

Kathleen E. Metz, University of California Berkeley, kmetz@berkeley.edu
Richard Lehrer, Vanderbilt University
Brian J. Reiser, Northwestern University
Leona Schauble, Vanderbilt University/Peabody College
Jay Labov, National Academy of Sciences

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Symposium - Climate Change Education: Teaching, Learning, and Assessment

10:15am-11:45am, Caribbean Salon 2

Presenters:

Anita Roychoudhury, Purdue University, aroychou@purdue.edu
Daniel Shepardson, Purdue University
Bruce Patton, The Ohio State University
James R. McGinnis, University of Maryland
Andrew Hirsch, Purdue University
Wayne Breslyn, University of Maryland
Emily Hesteness, University of Maryland
Chris McDonald, University of Maryland
William C. Kyle, Jr., University of Missouri - St. Louis

Strand 5: College Science Teaching and Learning (Grades 13-20)

Learning from Graduate Students in Science

10:15am-11:45am, Parrot Room

Presider:

Savannah E. Lodge-Scharff

Authentic Research Practices and Disciplinary Views of Graduate Students in the Physical Sciences

Kristy Chun, University of California, Santa Barbara, kristylauren@gmail.com

Surveying Research University Faculty, Graduate Students and Undergraduates: Reported Beliefs and Practices

Gili Marbach-Ad, University of Maryland, gilim@umd.edu
Kathryn Ziemer, University of Maryland, College Park
Michal Orgler, University of Maryland, College Park
Robert L. Infantino, University of Maryland, College Park
Katerina V. Thompson, University of Maryland, College Park

Graduate Teaching Assistants and Inquiry-Based Integrated Chemistry-Biology Laboratory Units: The Impact of Extended Professional Development

Jacinta M. Mutambuki, Western Michigan University, jacinta.m.mutambuki@wmich.edu
Renee S. Schwartz, Western Michigan University

Preliminary Lessons Learned from GK-12 Graduate Fellow Scientists in High Schools with Biotechnology Industry Partnerships

Kim C. Sadler, Middle Tennessee State University, kim.sadler@mtsu.edu
Mary B. Farone, Middle Tennessee State University
Anthony Farone, Middle Tennessee State University
Ginger H. Rowell, Middle Tennessee State University
Jennifer Dye, Pope John Paul High School
Todd P. Gary
Patrick Phoebus, Middle Tennessee State University

Strand 7: Pre-service Science Teacher Education

Beginning Teachers' Abilities and Skills

10:15am-11:45am, Río Mar Salon 9

Exploring Preservice Teachers Development of Awareness of Student Thinking

Vicky Pilitsis, Rutgers University, pilitsisv2@yahoo.com
Ravit G. Duncan, Rutgers University

Preservice Teachers' Abilities to Construct Written Scientific Explanations

Nicole J. Glen, Bridgewater State University, nicole.glen@bridgew.edu

Using Critical Experiences to Build Understanding of Science Teacher Educators' Pedagogical Knowledge

Rebecca Cooper, Monash University, rebecca.cooper@monash.edu

The Relationship Between Teacher Practice and Teacher Leadership Skills in Beginning Teachers

Zora Wolfe, Knowles Science Teaching Foundation, zwolfe@kstf.org

Strand 8: In-service Science Teacher Education

Innovative Models of Professional Development

10:15am-11:45am, Sea Gull Room**President:**

Katie Van Horne, University of Washington

Designing Technology-Intensive Science, Technology, Math, and Engineering Professional Development: Insights From NSF's Itest ProjectsCarla M. McAuliffe, TERC, Carla_McAuliffe@terc.edu

Caroline Parker, Education Development Center, Inc.

Cathlyn Stylinski, University of Maryland Center for Environmental Science

Effecting 'Reform' Through Transformations in District-Wide Science Teacher Learning NetworksMatthew M. Schroyer, University of Illinois, schroye2@illinois.edu

Fouad Abd-El-Khalick, University of Illinois at Urbana-Champaign

Anita M. Martin, University Of Illinois

Caroline Hathornthwaite, University of British Columbia

Virginia Initiative for Science Teaching and Achievement: Developing Effective Elementary Science Teachers, Year TwoDonna R. Sterling, George Mason University, dsterlin@gmu.edu

Elizabeth W. Edmondson, Virginia Commonwealth University

Juanita Jo Matkins, College of William & Mary

Mollianne Logerwell, George Mason University

Anne Mannarino, College of William and Mary

Integrating Online and Face-to-Face: A Social Networking Approach to Professional DevelopmentCarolyn Staudt, Concord Consortium, carolyn@concord.org

Rachel E. Kay, Concord Consortium

Strand 8: In-service Science Teacher Education

A Focus on Authentic Science Practices

10:15am-11:45am, San Cristobal**President:**

Steven McGee

Characterization of an Inner-City Elementary School Teacher Practice of ArgumentationReizelie Barreto, Towson University, rbarreto@towson.edu

A Pathway to Inquiry-based Teaching

Franz X. Bogner, University of Bayreuth,

franz.bogner@uni-bayreuth.de

Sofolkis Sotiriou, Ellinogermaniki Agogi, Athens

Teaching Science as Inquiry in the Classroom: Experiences from PakistanNelofer Halai, Aga Khan University, nelofer.halai@aku.edu**From "Sharing Out" to "Working through Ideas:" Helping Teachers Transition to More Productive Science Talk**Annette Sassi, TERC, annette_sassi@terc.edu

Anushree Bopardikar, Wisconsin Center for Education Research

Amelia Kimball, University of Illinois at Urbana-Champaign

Sarah Michaels, Clark University

Strand 8: In-service Science Teacher Education

On the Key Role of Content Knowledge

10:15am-11:45am, Río Mar Salon 4**President:**

Brian C. Baldwin

Learning from Stories of Youths' Informal Science Learning ExperiencesDaniel Birmingham, Michigan State University, birming2@msu.edu

Angela Calabrese-Barton, Michigan State University

Middle School Teachers' Ideas about the Practice of Developing and Using Models in ScienceCarrie A. Bemis, University of Colorado - Boulder, carrie.bemis@colorado.edu

William R. Penuel, University of Colorado Boulder

Hannah Jones, University of Colorado - Boulder

Mary L. Starr, University of Michigan

Teachers' Collaborative Inquiry into Scientific Models: Making Sense of StandardsTamara H. Nelson, Washington State University Vancouver, tnelson1@vancouver.wsu.edu

David Slavit, Washington State University Vancouver

Angie Deuel, Washington State University Vancouver

Characterizing Teachers' Incoming Science Content Knowledge In A Professional Development ProgramJoyce M. Parker, Michigan State University, parker@cns.msu.edu

Tom J. McConnell, Ball State University

Jan Eberhardt, Michigan State University

Strand 10: Curriculum, Evaluation, and Assessment

Science Curriculum Development and Implementation
from Global Perspectives

10:15am-11:45am, Pelican Room

Influences of Student and School Characteristics on Scientific Literacy Skills of Turkish Students in PISA

Sevgi Ipekcioglu, Middle East Technical University, isevgi@metu.edu.tr
Özgür Çelebi, Middle East Technical University
Ömer Geban, Middle East Technical University

Applied Science and Technology: The Implementation of a New Approach to Learning Science in Quebec

Ken H. Elliott, McGill University, kenneth.elliott@mail.mcgill.ca

Introduction of National Tests in Biology, Physics and Chemistry: Potential Influence on Teachers' Teaching Practices

Eva Lundqvist, Uppsala University, eva.lundqvist@edu.uu.se
Malena Lidar, Uppsala University
Leif Ostman, Uppsala University
Per Sund, Malardalen University
Leif Ostman, Uppsala University

Curricular Developments in South Africa: The Role of Argumentation in Secondary Science Teaching

Audrey Msimanga, University of the Witwatersrand, audrey.msimanga@wits.ac.za
Sibel Erduran, University of Bristol

Strand 10: Curriculum, Evaluation, and Assessment

Implementation and Evaluation of Science Curriculum

10:15am-11:45am, Río Mar Salon 2

Presider:

Mehmet Aydeniz

Developing a Teaching Strategies of Modeling and Metamodeling in Converging Lenses and its Image Formation

Koichi Furuya, Hokkaido University of Education,
furuya.koichi@a.hokkyodai.ac.jp

Instructional Materials to Support the Next Generation Science Standards: Results of A Proof-of-Concept Study

Eric R. Banilower, Horizon Research, Inc., erb@horizon-research.com
Michele M. Nelson, Horizon Research, Inc.

Finding Evidence in the Enactment: Elementary Science Teachers' Use of Educative Curriculum Materials

Anna Maria Arias, University of Michigan, aarias@umich.edu
Amber S. Bismack, Pennsylvania State University
Elizabeth A. Davis, University of Michigan
Annemarie S. Palincsar, University of Michigan
Andrew Shi, University of Michigan

A Impact Analysis of a 5th Grade Science Curriculum Based on the 5E Model

Timothy P. Scott, Texas A&M University, tim@science.tamu.edu
Carolyn M. Schroeder, Texas A&M University
Homer Tolson, Texas A&M University
Tse-Yang Huang, National Hsinchu University of Education, Taiwan
Omah M. Williams, Texas A&M University

Strand 11: Cultural, Social, and Gender Issues

Symposium - Expanding Perspectives and Participation in
Research on Teaching and Learning Science with Innovative
Methodological Approaches

10:15am-11:45am, Río Mar Salon 7

Presider:

Stephen M. Ritchie, Queensland University of Technology,
s.ritchie@qut.edu.au
Peter Hudson, Queensland University of Technology
Alberto Bellocchi, Queensland University of Technology
Senka Henderson, Queensland University of Technology
Donna King, Queensland University of Technology
Christina Siry, University of Luxembourg
Sonya N. Martin, Seoul National University
Kenneth G. Tobin, The City University of New York

Strand 11: Cultural, Social, and Gender Issues

Cross-cultural Experiences of Students in the Classroom

10:15am-11:45am, Río Mar Salon 8

Presider:

Alice Cottaar

Beyond Passive Broader Crossers: Students as Active Cultural Brokers in Urban Science Classrooms

Bhaskar Upadhyay, University of Minnesota, bhaskar@umn.edu
Michelle A. Fleming, Wright State University
Kristina Maruyama Tank, University of Minnesota

Discouraging Results: Problematizing Test Questions in Science Education

Margareta Serder, Malmo University, margareta.serder@mah.se
Anders Jakobsson, Malmo University

Creating Authentic Literacy Experiences for Culturally and Linguistically Diverse (CLD) 5th Graders' Content Understandings

Geeta Verma, University of Colorado Denver,
geeta.verma@ucdenver.edu

Strand 12: Educational Technology

Modeling and Mobile Applications

10:15am-11:45am, Río Mar Salon 3**President:**

Adem Tasdemir, Virginia Commonwealth University

Investigating Student Flow Experience During a Mobile Augmented Reality Science Game

Denise M. Bressler, Lehigh University, dmb309@lehigh.edu

Alec M. Bodzin, Lehigh University

Using Ipads to Teach Inquiry Science to Students with a Moderate Intellectual Disability

Bridget T. Miller, Purdue University, bmiller6@purdue.edu

Gerald H. Krockover, Purdue University

Zydeco: A New Mobile Application to Support Claim-Evidence-Reasoning Model

Ibrahim Delen, Michigan State University, delenibrahim@gmail.com

Wan-Tzu Lo, University of Michigan, Ann Arbor

Alex Kuhn, University of Michigan

Chris Quintana, University of Michigan

Joseph S. Krajcik, Michigan State University

Steve McGee, The Learning Partnership

Jennifer L. Winters, The Learning Partnership

Strand 13: History, Philosophy, and Sociology of Science

Curriculum & Creativity

10:15am-11:45am, Heron Room**President:**

Lisa M. Martin-Hansen

Parallel Roles for Nonformal Reasoning in Expert Scientific Model Construction and Classroom Discussions in Science

John J. Clement, University of Massachusetts, clement@educ.umass.edu

Grant Williams, St. Thomas University

Using Films to Engage Graduate Students in NOS and SIIan C. Binns, University of North Carolina at Charlotte,
ian.binns@unc.edu

Catherine M. Koehler, Southern Connecticut State University

Mark Bloom, Dallas Baptist University

Stylized Textbook Graphics of Cell Anatomy and Associated Student Misconceptions

Jennifer Landin, NC State University, jmlandin@ncsu.edu

"Nature of Scientists" - Students' Views about Scientists and their Activities

Wilfried Wentorf, Leibniz Institute, wentorf@ipn.uni-kiel.de

Tim Höffler, Leibniz Institute

Pay O. Dierks, Leibniz Institute

Heide Peters, Leibniz Institute

Ilka Parchmann, Leibniz Institute

Strand 14: Environmental Education

Research on Teaching and Learning about Short and Long-term Environmental Issues

10:15am-11:45am, Canary Room**President:**

Ceyhan Cigdemoglu

Building a Learning Progression for the Study of Natural Hazard and Disaster Risk Reduction

Sheila G. Oyao, University of Tartu, sheila77@ut.ee

Jack Holbrook, University of Tartu

Miia Rannikmaa, University of Tartu

Hazura Ab Bakar, SEAMEO-RECSAM

Using Argumentation about Historical Climate Data to Learn about Climate Change

Barry Golden, University of Tennessee, bwgolden@utk.edu

Martin G. Balinsky, Tallahassee Community College

PSTS' Mental Models about Role and Distribution of Ozone Layer and Ozone Layer Depletion

Hilal Yanis, Gazi University, hilalyanis@yahoo.com

Özgül Yılmaz Tüzün, Middle East Technical University

External Policy and Relations Committee Sponsored Session

Symposium - Blowing up the Silos! What will it take to Change 21st Century Science Education?

10:15am-11:45am, Caribbean Salon 1**President:**

John H. Falk, Oregon State University

Presenters:

Jonathan Osborne, Stanford University

Janet Coffey, Gordon & Betty Moore Foundation

Rudy Crew, Oregon Chief Education Officer

Lynn D. Dierking, Oregon State University

Strand 15: Policy

Related Paper Set- Inclusive STEM-focused High Schools:
STEM Education Policy and Opportunity Structures

10:15am-11:45am, Río Mar Salon 10

Discussant:

Martin Storksdieck, National Academy of Sciences
James E. Hamos, National Science Foundation

**Inclusive STEM-Focused High Schools: STEM
Education Policy and Opportunity Structures**

Sharon J. Lynch, The George Washington University, slynch@gwu.edu

Central High School Case Study

Nancy Spillane, George Washington University, nspillan@gwu.edu

Granite Secondary School Case Study

Erin E. Peters-Burton, George Mason University, epeters1@gmu.edu

**Expanding Access To STEM-Focused Education:
What Are The Effects?**

Ann House, SRI International, ann.house@sri.com
Barbara Means, SRI International

Lunch—On Your Own

12:00pm – 1:00pm

Concurrent Session #12

1:00pm – 2:30pm

**External Policy and Relations Committee and Strand
15 Co-Sponsored Session**

Symposium on Climate Change Education: Policies and
Implications

1:00pm-2:30pm, Caribbean Salon 1

Presider:

Sarah J. Carrier, North Carolina State University

Presider:

Barry W. Golden, University of Tennessee - Knoxville
Nancy W. Brickhouse, University of Delaware
J. Randy McGinnis, University of Maryland
Elizabeth M. Walsh, San Jose State University
Charles W. Anderson, Michigan State University
Wayne Breslyn, University of Maryland
Chris McDonald, University of Maryland
Emily Hestness, University of Maryland

**Strand 1: Science Learning, Understanding and
Conceptual Change**

Constructing and Examining Learning Progressions in
Science Education

1:00pm-2:30pm, Río Mar Salon 1

Students' Progression in Understanding Energy

Knut Neumann, Leibniz Institute for Science Education (IPN) Kiel,
neumann@ipn.uni-kiel.de
Gabriel Nagy, Leibniz Institute for Science Education (IPN) Kiel

**Young Children's Understanding of Earth's Features
and Changes**

Deborah C. Smith, Penn State University, dcs27@psu.edu

**Learning Progression of Lower Elementary Students'
Systemic Reasoning in Ecology**

Hayat Hokayem, Texas Christian University, h.hokayem@tcu.edu
Amelia W. Gotwals, Michigan State University

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

Science Learning within Physics Domains

1:00pm-2:30pm, Río Mar Salon 10

Presider:

Jonathan F. Osborne

**Promoting Self-Determined Learning in Science
Classrooms**

Anja Göhring, University of Regensburg,
anja.goehring@physik.uni-regensburg.de

**What Metacognitive Competences Trigger and
Support Personal Appropriation of Physics Content
Knowledge?**

Olivia Levrini, University of Bologna, olivia.levrini2@unibo.it
Paola Fantini, University of Bergamo, Italy

**The Effect of Lesson Duration (45 vs. 60 minutes) On
Quality of Physics Instruction**

Rainer Wackermann, Ruhr-University Bochum,
wackermann@physik.rub.de
Julia Hater, Ruhr-University Bochum

The Pedagogy of Inquiry in Introductory Physics

Daniel Z. Meyer, Illinois Institute of Technology, meyerd@iit.edu
Aracelis J. Scharon, Illinois Institute of Technology
James Kedvesh, Illinois Institute of Technology
Margaretann Connell, Chicago State University/Illinois
Institute of Technology

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Related Paper Set - Science Teacher Quality: Factors within School Organizations and Science Leadership Structures

1:00pm-2:30pm, Caribbean Salon 2

School Organization and Interpersonal Relationships: Teacher-Teacher Trust, Professional Community, and Variations in Schoolwide Science Achievement

Lara Smetana, Loyola University Chicago, lsmetana@luc.edu

Teachers' Knowledge and Perceptions about Community, Families & the Workplace

Malcolm B. Butler, University of Central Florida,
Malcolm.Butler@ucf.edu

Teacher Perceptions of Principal Qualities and Leadership Practices

Morgaen Donaldson, University of Connecticut,
morgaen.donaldson@uconn.edu

Science Instruction and Educational Equity: Teacher Perceptions about School Leadership

John Settlage, University of Connecticut, john.settlage@uconn.edu
Regina Suriel, University of Connecticut

School Organizations and Science Leadership: A Friendly Yet Focused Critique

Sherry A Southerland, Florida State University, ssoutherland@fsu.edu

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Symposium - Designing for Student Agency in Elementary Science Inquiry Classrooms

1:00pm-2:30pm, El Morro 1 & 2

Presenters:

Nancy Vye, University of Washington, nancyvye@u.washington.edu
Kari Shutt, University of Washington
Carrie Tzou, University of Washington
Giovanna Scalone, University of Washington
Amy Winstanley, Bellevue School District
Brian J. Reiser, Northwestern University
Andrew Morozov, University of Washington
John Bransford, University of Washington
Andrew W. Shouse, University of Washington
Philip L. Bell, University of Washington

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies

Symposium - Nanoeducation: Educational Challenges with an Emergent Scientific Field

1:00pm-2:30pm, Pelican Room

Presider:

Ron Blonder, The Weizmann Institute of Science

Discussant:

Gail M. Jones, North Carolina State University

Presenters:

Grant E. Gardner, East Carolina University
Virginie Albe, École normale supérieure de Cachan
Bénédicte Hingant, Institut Néel, Grenoble
Joel Chevrier, Institut Néel, Grenoble
Stefan Schwarzer, IPN, University of Kiel
Antti Laherto, University of Helsinki
Frederike Tirre, IPN, University of Kiel
Ilka Parchmann, University of Oldenburg
Ron Blonder, The Weizmann Institute of Science

Strand 5: College Science Teaching and Learning (Grades 13-20)

Examining College Science Student Beliefs

1:00pm-2:30pm, Parrot Room

Presider:

Sarah A. Haines

Optimism Bias Affecting College Students' Post Predictions of Exam Performance

N. Sanjay Rebello, Kansas State University, srebello@phys.ksu.edu
Carina Rebello, University of Missouri

Tinkering and Technical Self-Efficacy of Engineering Students at the Community College

Dale R. Baker, Teachers College, dale.baker@asu.edu
Lorelei Wood, Chandler-Gilbert Community College
James Corkins, Maricopa Community College
Stephen Krause, Ira A. Fulton School of Engineering

Influences to Career Aspirations in Science and Engineering Doctoral Candidates

Deborah Barry, Syracuse University, debarry@syr.edu
John W. Tillotson, Syracuse University

Strand 6: Science Learning in Informal Contexts

Related Paper Set - Learners in Action: Youth Narratives on Accessing and Transforming Science

1:00pm-2:30pm, Canary Room

Youth Researchers Erasing Disparities in STEM Opportunities

Takumi Sato, Michigan State University, tsato@msu.edu
Angela Calabrese-Barton, Michigan State University

Viewing School Science through Our Eyes: Middle School Girls' Vision for what School Science Could Be

Tara B. O'Neill, University of Hawaii, toneill@hawaii.edu
Angela Calabrese Barton, Michigan State University

Science Journalism Experiences from a Youth Perspective: Who Or what Transforms?

Joseph L. Polman, University of Colorado Boulder,
joseph.polman@colorado.edu
Jennifer M. Hope, McKendree University
Cynthia Graville-Smith, Saint Louis University

"Science is Not Just about Resistors:" Youth Narratives, Newsletters, and Mini-Documentaries as Ways into Science

Audrey Lachaine, Université de Montréal, karma_vi@yahoo.ca
Allison Gonsalves, Université de Montréal
Jrene Rahm, Université de Montréal

"But I Don't Like Anything about Science"

Daniel Birmingham, Michigan State University, birming2@msu.edu

Strand 7: Pre-service Science Teacher Education

Conceptions, Orientations and Beliefs towards Teaching Science

1:00pm-2:30pm, Río Mar Salon 9

Presenter:

Tonya D. Jeffery

Structure Inherent in Belief Systems

Brian S. Fortney, The University of Texas at Austin, bfortney@austin.utexas.edu

Relationship Between Pre-Service Elementary Science Teachers' Understandings of Nature of Science and Faith Developments

Gamze Cetinkaya, Middle East Technical University,
gamzecedinkaya@gmail.com
Jale Cakiroglu, Middle East Technical University

Predicting Student Teachers' Conceptions of Teaching Science with their Conceptions of Learning Science, Epistemological Beliefs, and Approaches to Learning Science

Elif Adibelli, University of Nevada, Las Vegas,
adibelli@unlv.nevada.edu
Mustafa Sami Topcu, Mugla Sıtkı Kocman University
Hasan Deniz, University of Nevada

Strand 8: In-service Science Teacher Education

Related Paper Set - Virginia Initiative for Science Teaching and Achievement—Second Year Statewide Implementation
1:00pm-2:30pm, Sea Gull Room

Elementary Teacher Professional Development

Anne Mannarino, College of William and Mary, amannarino@wm.edu
Jennifer Mosser, George Mason University
Elizabeth W. Edmondson, Virginia Commonwealth University

Science Methods Courses: Adapting Course One After Year One

Juanita Jo Matkins, College of William & Mary, jjmatk@wm.edu
Jacqueling McDonnough, Virginia Commonwealth University
Mollianne Logerwell, George Mason University

School District Science Coordinator Professional Development

Elizabeth W. Edmondson, Virginia Commonwealth University,
ewedmondson@vcu.edu
Victoria Reid, The College of William and Mary
Donna R. Sterling, George Mason University
Anne Mannarino, College of William and Mary

Science Education Faculty Professional Development

Mollianne Logerwell, George Mason University, mlogerwe@gmu.edu
Donna R. Sterling, George Mason University
Juanita Jo Matkins, College of William & Mary
Jacqueline McDonnough, Virginia Commonwealth University

Overall Research Outcomes

Randy L. Bell, Oregon State University, Randy.Bell@oregonstate.edu
Jennifer Maeng, University of Virginia

Strand 8: In-service Science Teacher Education

A Critical Examination of Professional Development Practices

1:00pm-2:30pm, San Cristobal

Presenter:

Jessica L. Godin

Giving Up Before the Finish Line: Teacher Transformation Resulting in Improved Student Achievement Takes Time

Jeff C. Marshall, Clemson University, marsha9@clemson.edu

Building Faculty Capacity to Deliver In-Service PD With Pre & Post Concept Mapping

Chad Huelsman, University of Cincinnati, helen.meyer@uc.edu
Helen M. Meyer, University of Cincinnati

If we Build them... : Can Active Learning Classrooms Promote Changes to Teaching Practice?

Elizabeth S. Charles, Dawson College, echarleswoods@gmail.com
 Silvia d'Apollonia, Dawson College
 Maria Claudia Orjuela Laverde, McGill University
 Chris Whittaker, Dawson College

Supporting Professional Development that Builds Capacity for Change

Julie C. Brown, University of Florida, brownjc@ufl.edu
 Kent J. Crippen, University of Florida
 Mary Jo Koroly, University of Florida
 Julie R. Bokor, University of Florida
 Drew S. Joseph, University of Florida
 Houda Darwiche, University of Florida

Strand 8: In-service Science Teacher Education

Factors to Consider in the Development of Inservice Education Programs

1:00pm-2:30pm, Río Mar Salon 4

President:

Nasser Mansour, Exeter University, Saudi Arabia

Models of Continuing Professional Development and Practices: Science Teachers' Perspective

Nasser Mansour, Exeter University, Saudi Arabia, n.mansour@ex.ac.uk
 Saeed Alshamrani, King Saud University, Saudi Arabia
 Abdulwali Aldahmash, King Saud University, Saudi Arabia

A Comprehensive Professional Development Program for Inservice Middle Science Teachers: Tensions and Early Successes

Rose M. Pringle, University of Florida, rpringle@coe.ufl.edu
 Jennifer C. Mesa, University of Florida
 Lynda Hayes, University of Florida

Cognitive, Affective and Behavioral Changes in K-8 Science Teaching

Martina Nieswandt, University of Massachusetts, Amherst, mnieswan@educ.umass.edu
 Kathryn Race, Race & Associates, Ltd.

Strand 10: Curriculum, Evaluation, and Assessment

Symposium - Genetics Education and the K-12 Science Framework: A Design Approach for Curriculum Development and Implementation
1:00pm-2:30pm, Río Mar Salon 2

President:

Michelle Williams, Michigan State University

Discussant:

Angela H. DeBarger, SRI International

Presenters:

Joi Merritt, Michigan State University, jmerritt@msu.edu
 Dante Cisterna, Michigan State University
 Erika D. Tate, bluknowledge LLC
 Liliana Ructinger, SRI International
 Yves Beauvineau, Denver Public Schools
 Tamara J. Heck, Michigan State University
 Michelle Williams, Michigan State University
 Angela H. DeBarger, SRI International

Strand 11: Cultural, Social, and Gender Issues

Symposium - Science Education For/Against 'Gated Communities'

1:00pm-2:30pm, Río Mar Salon 7

Presenters:

John L. Bencze, University Of Toronto, larry.bencze@utoronto.ca
 Steve Alsop, York University
 Lyn Carter, Australian Catholic University
 Matthew Weinstein, UW Tacoma Education Program

Strand 11: Cultural, Social, and Gender Issues

Sociocultural Perspectives of Scientific Classroom Communities

1:00pm-2:30pm, Río Mar Salon 8

President:

Anna Jober, Malmoe University

Some Socio-Cultural Factors Impacting Scientific Explanations by Biology Students: A Nigerian Case Study

Peter A. Okebukola, Lagos State University, pokebukola@yahoo.com
 Olatunde L. Owolabi, Lagos State University
 Sunday O. Banjoko, Lagos State University
 Owolabi F. Marinho, Okebukola Science Foundation

Teachers' Sense-Making about Culture in High Enrollment African American Middle School Science Classes

Eileen C. Parsons, University of North Carolina at Chapel Hill, rparsons@email.unc.edu

Descriptions and Analyses of the Science Classroom with a Social Class Perspective

Anna Jober, Malmoe University, anna.jober@mah.se

Creating School Scientific Communities among Urban Refugee ELL Populations

Joseph A. Johnson, Edinboro University of Pennsylvania,
jjohnson@edinboro.edu
Randy Yerrick

Strand 12: Educational Technology

Related Paper Set - Technology to Support Students in Constructing Scientific Understanding Using Real and Model-derived Data

1:00pm-2:30pm, Río Mar Salon 3

Presider:

Steven McGee

Supporting Student Understanding of Submicroscopic Interactions Using Technology

Infused Materials: A Curriculum Design Study

Dan Damelin, The Concord Consortium, ddamelin@concord.org
Shawn Y. Stevens, University of Michigan
Sung-Youn Choi, Michigan State University
Richard T. Russell, Michigan State University

Evaluating Where Interactive Heat-Transfer Simulations are Most Effective

Rachel E. Kay, Concord Consortium, rkay@concord.org
Amy Pallant, The Concord Consortium
Edmund Hazzard

Promoting Students' Scientific Argumentation with Computational Model-Based Investigations

Amy Pallant, The Concord Consortium, apallant@concord.org
Hee-Sun Lee, University of California, Santa Cruz
Sarah Pryputniewicz, The Concord Consortium

Evaluating the Benefits of Technology-Enabled, Real-Time Feedback in the Science Classroom

Kimberle Koile, The Concord Consortium, kkoile@concord.org
Nathan Kimball, The Concord Consortium
Sarah Pryputniewicz, The Concord Consortium
Joseph S. Krajcik, Michigan State University

Strand 13: History, Philosophy, and Sociology of Science

Related Paper Set - Explicit-Reflective Nature of Science (NOS) Instruction Across Contexts and Learner Outcomes

1:00pm-2:30pm, Heron Room

Impacts of Explicit/Reflective Nature of Science Instruction in the Context of an Undergraduate Biology Course

Renee S. Schwartz, Western Michigan University, r.schwartz@wmich.edu

Third Grade Students' Conceptions of NOS Following One Year of Explicit Reflective NOS Instruction

Valarie L. Akerson, Indiana University, vakerson@indiana.edu
Ingrid Weiland, University of Louisville
Vanashri Nargund-Joshi, SUNY-Buffalo
Kate Pongsanon, Indiana University

The Effect of an Explicit-Reflective Instructional Approach on Inservice Science Teachers' Understandings and Practices Related to Nature of Science

Nader Wahbeh, Qattan Center for Educational Research and Development, nwahbeh@gmail.com
Fouad Abd-El-Khalick, University of Illinois at Urbana-Champaign

Examining Inservice Science Teachers' Views of Nature of Science in an Argumentation Professional Development Program

Christine V. McDonald, Griffith University, c.mcdonald@griffith.edu.au
Deborah Heck, University of the Sunshine Coast

Concurrent Session #13

2:45pm - 4:15pm

Presidential Sponsored Session

NARST Leadership Team Task Force Response to the NGSS

2:45pm-4:15pm, Canary Room

Presiders:

Sharon Lynch, George Washington University
Lynn Bryan, Purdue University

Presenters:

Eric Banilower, Horizon Research, Inc.
Janet Carlson, BSCS
Betsy Davis, University of Michigan
Alejandro Gallard, Georgia Southern University
Julie Gess-Newsome, Willamette University
Felicia Moore Mensah, Teachers College, Columbia University
Tamara Moore, University of Minnesota
Maria Ruiz Primo, University of Colorado Denver
Senay Purzer, Purdue University
Sherry Southerland, Florida State University
Mark Windschitl, University of Washington
John Falk, Oregon State University

Strand 1: Science Learning, Understanding and Conceptual Change

Symposium - Thinking with Evidence: Supporting Students' Use of Evidence in Scientific Modeling

2:45pm-4:15pm, Río Mar Salon 1

Presider:

Ravit G. Duncan, Rutgers University

Presider:

Jessica J. Thompson, University of Washington

Christina V. Schwarz, Michigan State University

Lisa Kenyon, Wright State University

Aubree Webb, Penn State University

Richard A. Duschl, Penn State University

Michael Dianovsky, Rutgers University

Hosun Kang, University of Washington

Cynthia Passmore, University of California, Davis

Julia Svoboda, University of California, Davis

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Assessment-Related Issues and Science Learning

2:45pm-4:15pm, Río Mar Salon 10

Presider:

Elaine Klein, University of Washington

AP Science Students Memorize to Study for Tests More than their Peers

Michelle Reicher, University of Michigan, Ann Arbor,
reicher@umich.edu

Nancy B. Songer, The University of Michigan

Creative Little Scientists: First Research Results about Enabling Creativity through Science in Early Years Education

Esme B. Glauert, University of London, e.glauert@ioe.ac.uk

Fani Stylianidou, Ellinogermaniki Agogi

Sari Havu-Nuutinen, University of Eastern Finland

Improving Physics Learning by Using Multiple-Choice Tasks for Feedback Purposes

Henning Rode, Institute for Mathematics and Physics Education,
rode@idmp.uni-hannover.de

Gunnar Friege, Institute for Mathematics and Physics Education

The Influence of Student Positioning on Formative Assessment Interactions in a Middle School Classroom

Amy Trauth-Nare, Towson University, atrauthnare@towson.edu

Gayle A. Buck, Indiana University

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Computer and Gaming-Related Projects and Science Learning

2:45pm-4:15pm, Caribbean Salon 2

Presider:

Rowhea M. Elmesky

Earthquake: An Educational Innovation Engaging Students in the STEM Domains of Earthquake Engineering

Abigail C. Perkins, Texas A&M University, acperkins@neo.tamu.edu

Carol L. Stuessy, Texas A&M University

Beyond Computational Thinking: Resources for Development of Collaborative Perspectival Computer Programming and Modeling

Pratim Sengupta, Vanderbilt University,

pratim.sengupta@vanderbilt.edu

Amy V. Farris, Vanderbilt University

Amanda C. Dickes, Vanderbilt University

Gokul Krishnan, Vanderbilt University

Kara Krinks, Vanderbilt University

Are Teachers able to Foster Experimental Skills with Hands-on and Computer-based Learning Environments?

Silke Schiffhauer, Ruhr University Bochum,

silke.schiffhauer@uni-due.de

Joachim Wirth, Ruhr University Bochum

Detlev Leutner, University of Duisburg-Essen

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies

Symposium - Energy as a Crosscutting Concept: Research and Impact on Teaching and Learning of Science

2:45pm-4:15pm, Pelican Room

Presider:

Arthur Eisenkraft, University of Massachusetts Boston,
arthur.eisenkraft@umb.edu

David L. Fortus, Weizmann Institute of Science

Joseph S. Krajcik, Michigan State University

Knut Neumann, Leibniz Institute (IPN) Kiel

Jeffrey Nordine, Trinity University

Robert F. Chen, University of Massachusetts Boston

Strand 5: College Science Teaching and Learning (Grades 13-20)

Informing College Teaching Practices

2:45pm-4:15pm, Parrot Room

Presiders:

Emily M. Walter, University of Missouri

Stephen B. Witzig, University of Massachusetts

Influence of PCK for Teaching Evolution on Student Outcomes in a Non-Majors' College Course

Emily M. Walter, University of Missouri, emw2n4@mail.missouri.edu

Patricia J. Friedrichsen, University of Missouri-Columbia

Investigating Experiences that Inform University Instructors' Specialized Knowledge for Teaching Protein Synthesis

Stephen B. Witzig, University of Massachusetts, sbwitzig@umassd.edu

Mark J. Volkmann, University of Missouri

Use of s Concept Inventory to Probe Student Learning and to Inform Faculty Development

Ann C. Smith, University of Maryland, asmith@umd.edu

Gili Marbach-Ad, University Of Maryland

Katerina Thompson, University of Maryland

Kenneth Frauwirth, University of Maryland

Daniel C. Stein, University of Maryland

Strand 7: Pre-service Science Teacher Education

Methods for Improving Preservice Teacher Education

2:45pm-4:15pm, Río Mar Salon 9

Presider:

Jacqueline T. McDonnough, Virginia Commonwealth University

Hands-On Science: Hands-On, Integrated Natural Science For Pre-Service Elementary School Teachers

Antonia Chimonidou, University of Texas at Austin, antonia@physics.utexas.edu

Randi Ludwig, University of Texas at Austin

Teacher Learning Supports in Japanese Elementary Science Curriculum Materials: Are they Educative Curriculum Materials?

Etsuji Yamaguchi, Kobe University, etuji@opal.kobe-u.ac.jp

Shota Komeda, Kobe University

Simulated Interactions as a Pedagogy for Preservice Science Teachers

Jeffrey J. Rozelle, Syracuse University, jrozelle@syr.edu

Sharon Dotger, Syracuse University

Bejamin Dotger, Syracuse University

Joanna Masingila, Syracuse University

Mary Beakland, Syracuse University

Strand 8: In-service Science Teacher Education

Scale-up Study of a Videocase-based Science Professional

Development Program: Teacher and Student Learning

2:45pm-4:15pm, Sea Gull Room

Presider:

Sarah Michaels, Clark University, smichaels.iclub@gmail.com

Scale-Up Study of a Videocase-Based Lesson Analysis PD Program: Teacher and Student Science Content Learning

Kathleen J. Roth, BSCS, kroth@bscs.org

Christopher Wilson, BSCS

Joseph A. Taylor, BSCS

Demonstrating the Impacts of Lesson Analysis PD: Meeting the Challenge of Developing Instructionally Sensitive Instruments

Christopher Wilson, BSCS, cwilson@bscs.org

Joseph A. Taylor, BSCS

Kathleen J. Roth, BSCS

Stella Focus on Student Learning: Elementary Students' Ideas about Earth's Changing Surface

Connie Hvidsten, BSCS, chvidsten@bscs.org

Elaine V. Howes, BSCS

Pedagogical Content Knowledge for Science Professional Development Leaders

Nancy Landes, Senior Science Educator, nlandes@bscs.org

Kathleen J. Roth, BSCS

Strand 8: In-service Science Teacher Education

Impact of Authentic Research Experiences on Professional Development

2:45pm-4:15pm, San Cristobal

At the Elbows of Scientists: Shaping Science Teachers' Thinking about Inquiry Teaching

Cheryl A. McLaughlin, University of Florida, chermac72@ufl.edu

Rose M. Pringle, University of Florida

Bruce J. MacFadden, University of Florida

Examining the Influence of RET's: Tracing Changes in Science Teachers' Beliefs and Affect

Michael Dentzau, Florida State University, mwd09c@my.fsu.edu

Patrick J. Enderle, Florida State University

Katrina Roseler, Florida State University

Sherry A. Southerland, Florida State University

Changes in Teachers' Beliefs and Classroom Practices Concerning Inquiry-Based Instruction Following a Year-Long Ret Program

Rommel J. Miranda, Towson University, Rmiranda@towson.edu
Julie B. Damico, Towson University

Mapping the Influence of Research Experiences for Teachers: Essential Features for Shaping Classroom Inquiry

Sherry A. Southerland, Florida State University, ssoutherland@fsu.edu
Ellen M. Granger, Florida State University
Pat J. Dixon, Florida State University
Patrick J. Enderle, Florida State University
Barry Golden, University of Tennessee, Knoxville
Katrina Roseler, Florida State University
Roxanne M. Hughes, Florida State University
Yavuz Saka, Florida State University

Strand 8: In-service Science Teacher Education

Symposium - A Pathway to Inquiry-based Teaching

2:45pm-4:15pm, Río Mar Salon 4

Presider:

Franz X. Bogner, University of Bayreuth,
franz.bogner@uni-bayreuth.de
Sofolkis Sotiriou, Ellinogermaniki Agogi, Athens

Strand 10: Curriculum, Evaluation, and Assessment

Impact of an Embedded Assessment System on Elementary Science Teaching and Learning: Power and Promise

2:45pm-4:15pm, Río Mar Salon 2

Presider:

Steve Schneider, WestEd

Presenters:

Kathy Long, University of California, Berkeley, klong@berkeley.edu
Yunyun Dai, University of California, Los Angeles
Ellen Osmundson, University of California, Los Angeles
Joan L. Herman, University of California, Los Angeles
Cathy Ringstaff, WestEd
Yourim Chai, University of California, Los Angeles
Michelle Tiu, WestEd
Mike Timms, Australian Council for Educational Research
Steve Schneider, WestEd
Jim Pellegrino, University of Illinois at Chicago

Strand 11: Cultural, Social, and Gender Issues

Related Paper Set - Culturally-congruent Approaches to Science Education in Native Communities

2:45pm-4:15pm, Río Mar Salon 7

A Culturally Congruent Participatory Process for Developing a Research Instrument in a Tribal Context

Regina Sievert, Salish Kootenai College, regina_sievert@skc.edu

Teacher and Community Collaboration: A Need for a Culturally Congruent STEM Curriculum

Melinda A. Howard, University of Idaho-Coeur d'Alene,
howa4758@vandals.uidaho.edu
Marcie Galbreath, University of Idaho, Coeur d'Alene
Aimee S. Navickis-Brasch, University of Idaho-Coeur d'Alene
Anne Kern, University of Idaho, Coeur d'Alene

Identification of Points of Intersection for Cultural Relevant STEM Instruction

Irene Grimberg, Montana State University, grimberg@montana.edu
Gail Whiteman Runs Him, Little Big Horn College, Crow Agency, MT

Reach for the Sky: Improving Science Agency for American Indian Students

Gillian Roehrig, University of Minnesota
Stephen Carlson, University of Minnesota
Brant Miller, University of Idaho

Native Teachers' Ideas for Restructuring Online Learning about Science Education

Elisabeth Swanson, Montana State University, Bozeman,
elsswa@gmail.com
Lee Cook, Montana State University, Bozeman
Dora Hugs, St. Charles School, Pryor, MT
Lisa Stevens, Crow Agency School, Crow Agency, MT
Gail Whiteman Runs Him, Little Big Horn College, Crow Agency, MT

Strand 11: Cultural, Social, and Gender Issues

Classroom Climate and Student Relationships Impact Discourse in STEM Classrooms

2:45pm-4:15pm, Río Mar Salon 8

Presider:

Regina Suriel

Examining Relationships among Lebanese Students' Conceptions of and Attitudes toward Science, Career Choices, Religious Affiliations and Gender

Rola Khishfe, American University of Beirut, rk19@aub.edu.lb
Saouma B. Boujaoude, American University of Beirut
Sahar K. Alameh, American University of Beirut

Cultural Practices' Impact on Muslim Elementary School Pupils' Conceptions of Nationally-Set Astronomy Concepts

Walid M. Shihabi, University of Oklahoma and Tulsa community college, shihabi@ou.edu

Edmund A. Marek, University Of Oklahoma

Promises and Challenges of Using Hybrid Discourses in Science Classrooms with Diverse Students

Minjung Ryu, University of Maryland, mryu@umd.edu

Strand 12: Educational Technology

Motivation, Attention and Metacognition

2:45pm-4:15pm, Río Mar Salon 3

Presider:

Steven McGee

Identifying a Gap Between Attitudes and Perceptions about ICT among Pre-Service STEM Teachers

Miri Barak, Technion, Israel Institute of Technology, bminiam@technion.ac.il

Shifts in Student Motivation during Usage of a Multi-User Virtual Environment for Ecosystem Science

Shari J. Metcalf, Harvard University, shari_metcalf@harvard.edu

Jason A. Chen, The College of William and Mary

Amy M. Kamarainen, New York Hall of Science

Tina Grotzer, Harvard University

Chris Dede, Harvard University

Students' Visual Attention while Using an Online Physics Tutoring System

Amy S. Rouinfar, Kansas State University, rouinfar@phys.ksu.edu

Christopher Nakamura, Saginaw Valley State University

Dean A. Zollman, Kansas State University

N. Sanjay Rebello, Kansas State University

Contribution of Metacognitive Instruction Embedded within an Open Inquiry-Based Learning to

Metacognitive Online Discourse

Idit Adler, Bar-Ilan University, Israel, dan-ident@bezeqint.net

Michal Zion, Bar - Ilan University

Zemira Mevarech, Bar - Ilan University

Strand 13: History, Philosophy, and Sociology of Science

Teaching Strategies & Assessment

2:45pm-4:15pm, Heron Room

Presider:

Jonathan F. Osborne

Linking Experiential Aspects of a Research Apprenticeship Program to Gains in NOS Understandings for High School Student Participants Experiencing Different Approaches to NOS Teaching and Learning

Stephen R. Burgin, Old Dominion University, sburgin@odu.edu

Troy D. Sadler, University of Missouri

Meaningful Assessment of Learners' Understandings of Scientific Inquiry – Views About Scientific Inquiry (VASI) Questionnaire

Norman G. Lederman, Illinois Institute of Technology, ledermann@iit.edu

Judith S. Lederman, Illinois Institute of Technology

Stephen Bartos, Illinois Institute Of Technology

Selina Bartels, Illinois Institute Of Technology

Allison Antink Meyer, Illinois Institute of Technology

Renee S. Schwartz, Western Michigan University

Teaching with and about Nature of Science: Coupling Inquiry and Nature of Science Teaching and Learning Goals

Fouad Abd-El-Khalick, University of Illinois at Urbana-Champaign, fouad@illinois.edu

NOS Views of Science and Non-Science Majors at the Onset of their Specialization

Ora Kahana, Technion – Israel Institute of Technology, oraka@technion.ac.il

Tali Tal, Technion – Israel Institute of Technology

Strand 14: Environmental Education

Symposium - The Policy, Practice, and Research Nexus of Climate Change Education

2:45pm-4:15pm, El Morro 1 & 2

Presider:

J. Randy McGinnis, University of Maryland, jmcginni@umd.edu

Nancy Brickhouse, University of Delaware

Wayne Breslyn, University of Maryland

Chris McDonald, University of Maryland

Emily E. Hestness, University of Maryland

Anita Roychoudhury, Purdue University

Daniel P. Shepardson, Purdue University

Bruce R. Patton, The Ohio State University

Andrew Hirsch, Purdue University

Joel D. Wilson, Rossville Middle School

Carolyn Parker, Johns Hopkins University

Evening/Social Events

Equity and Ethics Committee Sponsored Dinner
4:45pm – 10:00pm, Off-site – Barrachina Restaurant,
San Juan

Dinner, including tax and gratuity, is \$35.

NOTE: Must register for this event with Advance Conference
Registration - maximum attendance 100.

In an effort to reduce paper consumption and promote environmental awareness, NARST has decided to exclude Abstracts from this year's paper program. You may find all Abstracts posted in the online program on the NARST website at www.narst.org and on the Conference CD included with the program. We hope that you will have a positive NARST Annual International Conference experience while supporting our sustainable practices.

Abstracts

When a presentation has greater than 5 authors, only the first 5 authors are indexed in accordance with the Publication Manual of the American Psychological Association (6th Edition).

Author Index

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Abdul, Tunku | Rahman College, Malaysia | 65, 117

Abegglen, Kim | Hockinson Middle School | kimgrt3@comcast.net | 44

Abrams, Eleanor | University of New Hampshire | eleanorabrams@unh.edu | 89, 94

Adams, Martin | University of Minnesota | 64

Adams, Krista | University of Nebraska-Lincoln | 79, 93

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Adibelli, Elif | University of Nevada Las Vegas | 94

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Akcaoglu, Mete | 47

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Akks, Recai | Abant Izzet Baysal University, Turkey | 66

Akom, George | University of Hong Kong | 96

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Allen, Charles | Indiana University-Purdue | 89

Allmon, Warren | Cornell University the Paleontological Research Institution | 89

Allouche, Amira | Israel Institute of Technology | 86

Almahrouqi, Asma | University of Leeds | 95

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Alshamrani, Saeed | King Saud University | 80, 116

Alshaya, Fahad | King Saud University | 80, 116

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Amettler, Jaime | University of Leeds | 94

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Arabacioglu, Sertac | Mugla University | 117

Archer, Louise | King's College London | 98

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Ariño De La Rubia, Leigh | Tennessee State University | leighariñodelarubia@gmail.com | 76, 78, 105

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Asshoff, Roman | Münster University, Germany | 95

Atchison, Christopher | Georgia State University | catchison@gsu.edu | 89

Atwater, Mary | University of Georgia | atwater@uga.edu | 52, 63, 70, 80

Atwood, Jon | Marshall University | 68

Aulls, Mark | McGill University | 49

Austin, Barbara | Wittenberg University | 44, 57

Avargil, Shirley | Israel Institute of Technology | savargil@technion.ac.il | 70

Avraamidou, Lucy | University of Nicosia | avraamidou@unic.ac.cy | 79

Awong-Taylor, Judy | Georgia Gwinnett College | 70

Ayar, Mehmet | Texas A&M University | 73

Aydemir, Murat | 60

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Aydin, Sevgi | Yuzuncu Yil University | sevgi.aydin45@hotmail.com | 77, 111, 118

Ayene, Mengesha | Bahir Dar University, Ethiopia | 90

Azaiza, Ibtesam | Haifa University - Oranim | 120

Back, Hamin | Michigan State University | haminback@gmail.com | 47

Baenziger, Joan | Iowa State University | 103

Bahceci, Dilber | 76

Bailey, Janelle | University of Nevada, Las Vegas | Janelle.Bailey@unlv.edu | 63, 109

Baker, Dale | Arizona State University | DALE.BAKER@asu.edu | 41

Balcerzak, Phyllis | Washington University | 69

Balcin, Bilal | Karadeniz Technical University, Trabzon, Turkey | 95

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Bang, Megan | University of Washington | 107, 114

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Banner, Indira | University of Leeds, UK | 65

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Bar, Varda | Hebrew University | 116

Barak, Miri | Israel Institute Of Technology | 75

Baram-Tsabari, Ayelet | Technion - Israel Institute of Technology | ayelet@technion.ac.il | 73, 94, 110

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Barendsen, Erik | Radboud University Nijmegen, ILS-RU | ebarendsen@ilslr.nl | 118

Barlow, J.Z. | UMass-Amherst | 119

Barnett, Mike | Boston College | 50

Barreto-Espino, Reizelle | Towson University | rbarreto@towson.edu | 100

Barrett, Sarah | York University | sbarrett@edu.yorku.ca | 65, 75, 116

Barrow, Lloyd | University Of Missouri | 47, 58, 69, 98

Barry, Deborah | Syracuse University | 87

Bartlett, Felicia | University of Maryland, College Park | 43

Bartos, Stephen | Illinois Institute Of Technology | 46, 96

Barufaldi, James | University of Texas at Austin | 44

Bayne, Gillian | Lehman College CUNY | 44

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Beishuizen, Jos | Vrije Universiteit, Amsterdam, The Netherlands | 42

Belarmino, Jeremy | University of Illinois at Urbana-Champaign | 99

Bell, Philip | University of Washington | 55, 107

Bell, Randy | University of Virginia | 46, 50

Ben-Chaim, David | Haifa University - Oranim | 120

Benze, J. Lawrence | University of Toronto | 51, 78, 80, 88, 115

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Bernstein, Debra | TERC | debra_bernstein@terc.edu | 62

Berry, Brandi | University of Nebraska - Lincoln | 58

Berry, Nya | Clark County School District | 111

Bessenbacher, Ann | Purdue University | 91

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Bilcan, Kader | Ataturk University | 94, 119

Bills, Patricia | Michigan State University | 74

Binns, Ian | University of North Carolina-Charlotte | 72

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Bloom, Mark | Texas Christian University | 72

Bloom, Nena | Northern Arizona University | 97

Bohe, Rene | University of Georgia | 74

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Bogner, Franz | University Of Bayreuth | 46

Bohn, Sandra | University of Southern Mississippi | 77

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Bozeman, Todd | Texas A&M University | tbozeman71@tamu.edu | 66

Braaten, Melissa | University of Wisconsin | 109

Branco, Brett | Brooklyn College- CUNY | 99

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Breitbarth, Pam | Conrad Ball Middle School | 42

Breslyn, Wayne | University of Maryland | 41, 87

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Brickley, Annette | Challenger Center for Space Science Education | 117

Brighton, Catherine | University of Virginia | 113

Brod, Rod | University of Montana-Missoula | 113
Brookes, David | Florida International University | 45
Brown, Sherri | University of Louisville | 69
Brown, Jaweer | EngenderHealth | 80
Brown, Julie | University of Florida | brownjc@ufl.edu | 112
Brown, David | University of Illinois at Urbana-Champaign | 114
Brown, Bryan | Stanford University | brbrown@stanford.edu | 64, 107
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Buck, Gayle | Indiana University Bloomington | gabuck@indiana.edu | 50, 59, 64, 71, 75, 79, 91, 106, 116
Buckley, Barbara | WestEd | bbuckley@wested.org | 85, 90
Buhr, Susan | University of Colorado | 42
Bulte, Astrid | Utrecht University | 50
Burcks, Shannon | University of Missouri-Columbia | burckssm@missouri.edu | 74
Burgin, Stephen | University of Florida | sburgin@ufl.edu | 81
Burke, Briana | Stonehill College | 79
Burke, Lydia E Carol-Ann | OISE, University of Toronto | carolann.burke@utoronto.ca | 88
Burton, Susie | Tecumseh Junior High School | 56
Busch, Kirstin | University of Texas, Austin | 50, 86
Butler, Malcolm | University of South Florida | 70, 80
Buxner, Sanlyn | University of Arizona | buxner@email.arizona.edu | 63, 79
Buxton, Cory | University Of Georgia | 120
Byerly, Maria | Brown University | 98
Cahill, Clara | University of Michigan | clacah@umich.edu | 68
Cakir, Birgul | Agri Ibrahim Cecen University | 76, 87
Cakiroglu, Jale | Middle East Technical University | jaleus@metu.edu.tr | 109, 119
Cakmakci, Gultekin | Hacettepe University | 94
Calabrese Barton, Angie | Michigan State University | acb@msu.edu | 41, 107, 108, 115
Cam, Aylin | Mugla University | 117
Cambli, Jeff | The Hebrew University of Jerusalem | 109
Campbell, Chad | The Ohio State University | campbell.742@osu.edu | 93
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Cantrell, Pamela | Brigham Young University | 109
Capobianco, Brenda | Purdue University | 41
Capps, Daniel | University of Maine | danielcapps@gmail.com | 58
Capraro, Mary | Texas A&M University | 73
Cardella, Monica | Purdue University | 50
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Carlone, Heidi | University of North Carolina at Greensboro | 60, 107
Carlsen, William | The Pennsylvania State University | 89
Carlson, Stephan | University of Minnesota | 67
Carlson, Janet | BSCS | jcarlson@bscs.org | 45, 67, 93, 106, 112
Carrier, Sarah | 61, 89
Carroll, Kristoffer | Clark County School District | 65
Carter, Lyn | Australian Catholic University | 51
Cartwright, Tina | Marshall University | tina.cartwright@marshall.edu | 68
Carvalho, Alice | Université de Montréal | 45, 107
Cass, Cheryl | North Carolina State University | 64, 104
Caulkins, Joshua | University of Rhode Island | 98
Cavagnetto, Andy | Binghamton University | acavagne@binghamton.edu | 66
Cepini, Salih | Karadeniz Technical University | karayilmaz@hotmail.com | 80
Cetin, Pinar | Bolu Abant İzzet Baysal University | 67
Çetin-Dindar, Ayla | Middle East Technical University, Ankara, Turkey | 65
Cha, Heeyoung | Korea National University of Education | 71
Chabalengula, Vivien | Southern Illinois University | mwence@siu.edu | 78, 110
Chakraverty, Devasmita | University Of Virginia | dc5na@virginia.edu | 92
Chang, Mary | mkhchang@hawaii.edu | 68
Chang, Huey-Por | National Changhua University of Education | 43, 72, 92
Chang, Chun-Yen | National Taiwan Normal University | 51, 64, 94
Chanlen, Nippon | University of Iowa | nippon-chanlen@uiowa.edu | 79, 118
Chansky, James | Brown University | 98
Charmatz, Kim | Daemen College | kcharmat@daemen.edu | 116
Charney, Jeffrey | Evaluator | 51
Chee, Choy Siew | Rahman College, Malaysia | 65, 117
Chee, Joe | University of California, Santa Cruz | 121, 120
Cheek, Kim | University of Ciputra | cheekkim8@gmail.com | 43
Chen, Ying-Chih | University of Minnesota | chen2719@umn.edu | 60
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Cheng, Ya-Wen | University of Missouri | 44, 63, 97
Cheng, Rebecca | George Mason University | 64, 94
Cheyne, Michele | Knowles Science Teaching Foundation | 58
Chi, Michélene | Arizona State University | 49, 71
Chien, Yu-Ta | National Taiwan Normal University | yutachien@ntnu.edu.tw | 94
Childress, Amy | Purdue University | 91
Chin, Chi-Chin | National Taichung University of Education | 108
Chin, Ng Swee | Rahman College, Malaysia | 65, 117
Chinn, Pauline | University of Hawaii-Manoa | 60
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Chung, Chang-Hung | National Changhua University, Taiwan | 43
Cinmre, Yasin | Karadeniz Technical University, Trabzon, Turkey | 95
Cisterna, Dante | Michigan State University | 55
Claesgens, Jennifer | Northern Arizona University | 97
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Clarke, Anthony | 120
Clary, Renee | Mississippi State University | rclary@geosci.msstate.edu | 88
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Cohen, Al | The University of Georgia | 80
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Coleman, Tamara | Western Michigan University | toleman@lowellschools.com | 110
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Colonese, Thomas | American Indian Studies, University of Washington | 99
Conoley, Collie | University of California, Santa Barbara | 120
Constantinou, C. P. | University of Cyprus | 91
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Cook, Michelle | Clemson University | mcook@clemson.edu | 70, 71, 108
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Cope, Gregory | North Carolina State University | 57
Copur Gencturk, Yasemin | University of Illinois at Urbana-Champaign | ycopur2@illinois.edu | 69
Corkins, James | Mesa Community College and Arizona State University | james.corkins@gmail.com | 80
Corlu, Sencer | Texas A&M University | 73
Corrigan, Seth | Lawrence Hall of Science | 74
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Covitt, Beth | University of Montana | beth.covitt@umontana.edu | 56
Coy, Allison | Kansas State University | 93
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Creighton, Jean | UWM Planetarium | 110
Crippen, Kent | University of Florida | 65, 111
Criswell, Brett | Georgia State University | bcriswell@gsu.edu | 114
Crouch, Robert | Vanderbilt University | 109
Crowl, Michele | Pennsylvania State University | 62
Crowson, H. Michael | University Of Oklahoma | 80
Crowther, David | University of Nevada, Reno | crowther@unr.edu | 56
Cruet-Villavicencio, Kathleen | The University of Texas, Austin | kathleen.cruet@gmail.com | 47
Cuesta, Evert | Northeastern Illinois University | 77
Culbertson, Michael | University of Illinois at Urbana-Champaign | 90
Cullen, Theresa | University of Oklahoma | tacullen@ou.edu | 80
Cunningham, Christine | Museum of Science, Boston | 50
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Dancy, Melissa | University of Colorado Boulder | 112
Dani, Danielle | Ohio University | dani@ohio.edu | 115
Danielowich, Robert | Adelphi University | rdanielowich@adelphi.edu | 110
Danish, Joshua | Indiana University | 114
Dasgupta, Annwesa | Purdue University | 57
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De Jong, Onno | Utrecht University, Utrecht | 50
de Jong, Ton | University of Twente | 70
Deaton, Benjamin | Anderson University | 72
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Devetak, Iztok | University of Ljubljana, Slovenia | 65

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Morag, Orly | Technion | 89

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Morales, Consuelo | University of Michigan | 59, 103

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Roseman, Jo Ellen | AAAS Project 2061 | 106
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Stanier, Charles | University of Iowa | 58

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Stiensmeier-Pelster, Joachim | Justus Liebig University Giessen | 97

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Storcksdeick, Martin | NRC Board of Science Education | 55

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Wang, XiHui | 49
Wang, Ping | Ching Yun University | 63
Wang, Jianlan | Indiana University | 75
Wang, Jian | University of Nevada, Las Vegas | 119
Wang, Ting | University of Washington, Seattle | 104, 116
Wang, Kuo-Hua | National Changhua University of Education, Taiwan | 43, 72
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Willis, Martha | 109
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 Yifrach, Merav | 118
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 Yoon, So Yoon | 80
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 Yore, Larry | University of Victoria, Canada | 59, 87
 You, Hye Sun | The University of Texas at Austin | 77
 Young, Monica | Syracuse University | 87
 Yow, Jan | University of South Carolina | 105
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