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ACKNOWLEDGMENTS

The following members of the Program Committee helped in preparing and editing the 2012 NARST Annual International Conference Program Book.

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William C. Kyle, Jr., Executive Director
Toni A. Sondergeld, NARST Scheduling Coordinator
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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.

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. The Journal 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. This volume 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.
• E-NARST News describing recent developments in research and in the profession. E-NARST News provides opportunities to work with prominent people throughout the world on research projects and with affiliated organizations such as the National Science Teachers Association (NSTA), the Association for Science Teacher Education (ASTE), and the American Association for the Advancement of Science (AAAS). Our newsletter is now published online twice a year and posted to 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 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. The overall length of the paper sessions may vary based on the number of papers assigned to that session, but each paper within a particular session will observe the 15-minute presentation guideline. For example, four papers grouped together will be given a 90-minute time period, while two papers grouped together will be given a 45-minute time period for the overall session. This will optimize the grouping of papers by allowing strand coordinators to group papers based on similarity, rather than forcing the grouping of papers to fit a standard time block. Each presenter is expected to disseminate a paper during or immediately following the session, unless the paper is on the NARST 2012 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 2012 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 2012 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. Audience members will have approximately 90 minutes to circulate throughout the room to view the posters and interact with the presenters. Each presenter must set up the display prior to the start of the session and then remove it promptly at the end of the session. Each presenter is expected to disseminate a paper during the session, unless a summary of the poster is on the 2012 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. So, 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 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. Presider Roles
• 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.

Discussant Roles
• 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

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2013 NARST Annual International Conference

The Program Chair invites NARST members and others to participate in the 2013 NARST Annual International Conference, and start planning next year’s program proposals during the 2012 conference.

VENUE: NARST 2013 Annual International Conference
    Wyndham Rio Mar
    Rio Grande, Puerto Rico
    April 6-9, 2013
Visit the website at: www.wyndhamriomar.com

THEME:
The S in STEM Education: Policy, Research and Practice

Science, mathematics, engineering and technology are often indistinguishable in STEM research, both practical and applied. Researchers are increasingly accustomed to transdisciplinary collaborations. At the same time, there is an increasing recognition, both from cognitive and practical perspectives, that the new generation of science students needs science education that is more rigorous, relevant, and related to their lives. Given both phenomena, the movement towards STEM education may be inevitable. The intention of this conference theme is to fuel rich discussions about the role of science in STEM education; update one another about new developments in STEM education across the globe; and stimulate new inquiry. The conference theme should also engage attendees in critiques of STEM education, and the economic implications often associated with it.

There is no universally agreed upon definition of STEM education, but one is offered here that may be a useful starting point: “…an interdisciplinary approach to learning where rigorous academic concepts are coupled with real-world lessons as students apply science, technology, engineering, and mathematics in contexts that make connections between school, community, work, and the global enterprise enabling the development of STEM literacy and with it the ability to compete in the new economy “ (Tsupros, Kohler, & Hallinen, 2009*).

We encourage NARST members to align their proposals, whenever feasible, with the 2013 NARST Annual International Conference theme.

SUBMISSION DEADLINE: The Program Chair or designate must receive your program proposals for the 2013 Annual International Conference by August 15, 2012. The deadline allows sufficient time for processing, reviewing and evaluating the many proposals. In June 2012, the call for program proposals will appear on the NARST website.

Conference Chair: Sharon J. Lynch, President-Elect

Future Meeting Dates for NARST, NSTA, and AERA

2012
NISTA Indianapolis, IN, March 29 - April 1
AERA Vancouver, British Columbia, Canada, April 13 - 17

2013*
NARST Rio Grande, Puerto Rico, April 6 - 9
NSTA San Antonio, TX, April 11 - 14
AERA Atlanta, GA, April 11 - 15

2014
NARST Pittsburgh, PA, March 30 - April 2
NSTA Boston, MA, April 3 - 6
AERA Philadelphia, PA, April 3 - 7

*AERA in 2011 announced it would meet in Atlanta, Georgia USA in 2013. NARST could find no acceptable venue in Atlanta due to the late decision by AERA for its 2013 conference venue. As a result, NARST broadened its geographical search and selected the Wyndham Rio Mar in Rio Grande, Puerto Rico as our 2013 conference venue. However, on 24 February 2012 AERA announced to its membership that its 2013 conference site and dates have been changed to San Francisco, CA, April 27 – May 1, 2013. NARST will continue to meet its contractual obligations and hold its 86th Annual International Conference at the Wyndham Rio Mar, which is nestled between the Atlantic Ocean and the El Yunque Caribbean National Forest in a lush hideaway on the “Isle of Enchantment”.
2011-12 Strand Coordinators

Strand 1: Science Learning, Understanding, and Conceptual Change
Anat Yarden, Michelle Cook

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Lisa A. Donnelly, Amy Taylor

Strand 3: Science Teaching—Primary School (Grades preK-6)
Rebecca Monhardt, Nicole Glen

Strand 4: Science Teaching—Middle and High School (Grades 5-12)
Anna Lewis, Sara Salloum

Strand 5: College Science Teaching and Learning (Grades 13-20)
Linda Keen-Rocha, Sanghee Choi

Strand 6: Science Learning in Informal Contexts
Sandra Martell, Anita Welch, Heather Toomey Zimmerman

Strand 7: Pre-service Science Teacher Education
Jennifer Wilhelm, Jacqueline McDonnough

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Strand 11: Cultural, Social, and Gender Issues
Geeta Verma, Shawn Holmes

Strand 12: Educational Technology
Reizelle Barreto, Len Annetta

Strand 13: History, Philosophy and Sociology of Science
Norm Lederman, Catherine Koehler

Strand 14: Environmental Education
Isha DeCoito, Jennifer Adams

Strand 15: Policy
Andy Shous, Sarah J. Carrier
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2000 David F. Treagust
2001 Sandra K. Abell
2002 Norman G. Lederman
2003 Cheryl L. Mason
2004 Andy (Charles) Anderson
2005 John R. Staver
2006 James Smymansky
2007 Jonathan Osborne
2008 Penny J. Gilmer
2009 Charlene M. Czerniak
2010 Richard A. Duschl
2011 Dana L. Zeidler
2012 J. Randy McGinnis

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

Paul Joslin 1975 – 1980
Bill Holliday 1980 – 1985
Glenn Markle 1985 – 1990
John Staver 1990 – 1995
Art White 1995 – 2000
David Haury 2000 – 2002
John Tillotson 2002 – 2007
William C. Kyle, Jr. 2007 – 2017

JRST Editors

James T. Robinson 1969
David P. Butts 1975 – 1979
James A. Shymansky 1980 – 1984
Ron Good 1990 – 1993
Charles A. Anderson and James J. Gallagher August 1999 – 2001
J. Randy McGinnis and Angelo Collins 2006 – 2010
Joseph Krajeck and Angela Calabrese Barton 2011 – 2015
### Current NARST Emeritus Members: 2011 / 2012

*Denote first time Emeritus members

<table>
<thead>
<tr>
<th>De Jong, Onno</th>
<th>Gunstone, Richard</th>
<th>Merzyn, Gottfried</th>
<th>Yager, Robert</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enochs, Larry*</td>
<td>Guo, Chorng-Jee</td>
<td>Poel, Robert</td>
<td>Yore, Larry *</td>
</tr>
<tr>
<td>Fensham, Peter</td>
<td>Hewson, Peter</td>
<td>Ritz, William</td>
<td>Zoller, Uri</td>
</tr>
<tr>
<td>Ferguson-Hessler, Monica</td>
<td>Holliday, William</td>
<td>Roberts, Douglas</td>
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<td>Gilbert, John</td>
<td>Jaffarian, Bill</td>
<td>Rowell, Patricia</td>
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<tr>
<td>Gilmer, Penny</td>
<td>Krockover, Gerald*</td>
<td>Segal, Lea</td>
<td></td>
</tr>
<tr>
<td>Glynn, Shawn</td>
<td>Lemke, Jay*</td>
<td>Smith, Edward</td>
<td></td>
</tr>
<tr>
<td>Good, Ron</td>
<td>Mason, Cheryl</td>
<td>Walding, Richard</td>
<td></td>
</tr>
</tbody>
</table>

### 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.

<table>
<thead>
<tr>
<th>Year</th>
<th>Awardee</th>
<th>Year</th>
<th>Awardee</th>
<th>Year</th>
<th>Awardee</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987</td>
<td>Paul DeHart Hurd</td>
<td>1998</td>
<td>James J. Gallagher</td>
<td>2008</td>
<td>Dorothy Gabel</td>
</tr>
<tr>
<td>1988</td>
<td>John W. Renner</td>
<td>1999</td>
<td>Peter J. Fensham</td>
<td>2009</td>
<td>Peter W. Hewson</td>
</tr>
<tr>
<td>1995</td>
<td>Wayne W. Welch</td>
<td>2006</td>
<td>John C. Clement</td>
<td></td>
<td>Larry Yore</td>
</tr>
<tr>
<td>1996</td>
<td>Carl F. Berger</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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.

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

<table>
<thead>
<tr>
<th>Year</th>
<th>Awardee</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>John J. Koran</td>
</tr>
<tr>
<td>1976</td>
<td>Anton E. Lawson</td>
</tr>
<tr>
<td>1977</td>
<td>no award</td>
</tr>
<tr>
<td>1978</td>
<td>Rita Peterson</td>
</tr>
<tr>
<td>1979</td>
<td>Linda R. DeTure</td>
</tr>
<tr>
<td>1980</td>
<td>M. James Kozlow and Arthur L. White</td>
</tr>
<tr>
<td>1981</td>
<td>William Capie, Kenneth G. Tobin, and Margaret Boswell</td>
</tr>
<tr>
<td>1982</td>
<td>F. Gerald Dillashaw and James R. Okey</td>
</tr>
<tr>
<td>1983</td>
<td>William C. Kyle, Jr., James A. Shymansky, and Jennifer Alport</td>
</tr>
<tr>
<td>1984</td>
<td>Darrell L. Fisher and Barry J. Fraser</td>
</tr>
</tbody>
</table>
| 1985 | Hanna J. Arzi, Ruth Ben-Zvi, and Uri Ganiel  
      (tie) Russell H. Yeany, Kueh 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 Hohnenshelf |
| 2003 | Wolff-Michael Roth |
| 2004 | Joanne K. Olson, Sharon J. Lynch, Joel Kuipers, Curtis Pyke and Michael Szesze |
| 2005 | Chi-Yan Tsui and David Treagust |
| 2006 | Leema Kuhn and Brian Reiser |
| 2008 | Guy Ashkenazi and Lana Tockus-Rappoport |
| 2009 | Jèrène Rahm |
| 2010 | Mark W. Winslow, John R. Staver, and Lawrence C. Scharmann |
| 2011 | Matthew Kloser |
| 2012 | Shelly R. Rodriguez and Julie Gess-Newsome |
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.

<table>
<thead>
<tr>
<th>Year</th>
<th>Awardee</th>
<th>Major Professor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>René Stofflett</td>
<td>Dale R. Baker</td>
</tr>
<tr>
<td>1993</td>
<td>Julie Gess-Newsome</td>
<td>Norman G. Lederman</td>
</tr>
<tr>
<td>1994</td>
<td>Carolyn W. Keys</td>
<td>Burton E. Voss</td>
</tr>
<tr>
<td>1995</td>
<td>Jerome M. Shaw</td>
<td>Edward Haertel</td>
</tr>
<tr>
<td>1996</td>
<td>Christine M. Cunningham</td>
<td>William L. Carlsten</td>
</tr>
<tr>
<td>1997</td>
<td>Jane O. Larson</td>
<td>Ronald D. Anderson</td>
</tr>
<tr>
<td>1998</td>
<td>Kathleen Hogan</td>
<td>Bonnie K. Nastasi</td>
</tr>
<tr>
<td>1999</td>
<td>Fouad Abd-El-Khaliek</td>
<td>Norman G. Lederman</td>
</tr>
<tr>
<td>2000</td>
<td>Danielle Joan Ford</td>
<td>Annemarie S. Palinscar</td>
</tr>
<tr>
<td>2001</td>
<td>Iris Tabak</td>
<td>Brian Reiser</td>
</tr>
<tr>
<td>2002</td>
<td>Mark Girod</td>
<td>David Wong</td>
</tr>
<tr>
<td>2003</td>
<td>Hsin-Kai Wu</td>
<td>Joseph Krajcik</td>
</tr>
<tr>
<td>2004</td>
<td>David L. Fortus</td>
<td>Ronald Marx and Joseph Krajcik</td>
</tr>
<tr>
<td>2005</td>
<td>Thomas Tretter</td>
<td>Gail M. Jones</td>
</tr>
<tr>
<td>2006</td>
<td>Stacy Olitsky</td>
<td>Kenneth Tobin</td>
</tr>
<tr>
<td>2007</td>
<td>Julia Plummer</td>
<td>Joseph S. Krajcik</td>
</tr>
<tr>
<td>2008</td>
<td>Victor Sampson</td>
<td>Douglas Clark</td>
</tr>
<tr>
<td>2009</td>
<td>Lei Liu</td>
<td>Cindy E. Hmelo-Silver</td>
</tr>
<tr>
<td>2010</td>
<td>Heather Toomey Zimmerman</td>
<td>Phillip Bell</td>
</tr>
<tr>
<td>2011</td>
<td>Jeffrey J. Rozelle</td>
<td>Suzanne M. Wilson</td>
</tr>
<tr>
<td>2011</td>
<td>Catherine Eberbach</td>
<td>Kevin Crowley</td>
</tr>
<tr>
<td>2012</td>
<td>Melissa Braaten</td>
<td>Mark Windschitl</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Year</th>
<th>Awardee</th>
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<tbody>
<tr>
<td>1993</td>
<td>Wolff-Michael Roth</td>
</tr>
<tr>
<td>1994</td>
<td>Deborah J. Tippins</td>
</tr>
<tr>
<td>1995</td>
<td>Nancy B. Songer</td>
</tr>
<tr>
<td>1996</td>
<td>Mary B. Nakhleh</td>
</tr>
<tr>
<td>1997</td>
<td>Peter C. Taylor</td>
</tr>
<tr>
<td>1998</td>
<td>J. Randy McGinnis</td>
</tr>
<tr>
<td>1999</td>
<td>Craig W. Bowen</td>
</tr>
<tr>
<td></td>
<td>Gregory J. Kelly</td>
</tr>
<tr>
<td>2000</td>
<td>Angela Calabrese Barton</td>
</tr>
<tr>
<td>2001</td>
<td>Julie A. Bianchini</td>
</tr>
<tr>
<td>2002</td>
<td>Alan G. Harrison</td>
</tr>
<tr>
<td>2003</td>
<td>Fouad Abd-El-Khaliek</td>
</tr>
<tr>
<td>2004</td>
<td>Grady J. Venville</td>
</tr>
<tr>
<td>2005</td>
<td>Randy L. Bell</td>
</tr>
<tr>
<td>2006</td>
<td>Heidi Carline</td>
</tr>
<tr>
<td>2007</td>
<td>Bryan A. Brown</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Year</th>
<th>Awardee</th>
<th>Major Professor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>Moreen K. Travis</td>
<td>Carol L. Stuessy</td>
</tr>
<tr>
<td>1996</td>
<td>Lawrence T. Escalada</td>
<td>Dean A. Zollman</td>
</tr>
<tr>
<td>1997</td>
<td>C. Theresa Forsythe</td>
<td>Jeffrey W. Bloom</td>
</tr>
<tr>
<td>1998</td>
<td>Renée D. Boyce</td>
<td>Glenn Clark</td>
</tr>
<tr>
<td>1999</td>
<td>Andrew B. T. Gilbert</td>
<td>Randy K. Yerrick</td>
</tr>
<tr>
<td>2000</td>
<td>Rola Fouad Khishife</td>
<td>Fouad Abd-El-Khalick</td>
</tr>
<tr>
<td>2002</td>
<td>Laura Elizabeth Slocum</td>
<td>Marcy Hamby Towns</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Year</th>
<th>Awardee(s)</th>
</tr>
</thead>
</table>
| 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 |
| 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 |

NARST Leadership Team & Committees

2011 – 2012

Officers:
President : J. Randy McGinnis  jmccginni@umd.edu  
President-elect: Sharon Lynch  slynch@gwu.edu  
Immediate Past President: Dana Zeidler  zeidler@coedu.usf.edu

Executive Board:
(12) Julie Bianchini  jbianchi@education.ucsb.edu  
(12) Renee Schwartz  r.schwartz@wmich.edu  
(12) Jan H. Van Driel  Driel@iclon.leidenuniv.nl  
(13) John Falk  falkj@science.oregonstate.edu  
(13) Xiufeng Liu  xliu5@buffalo.edu  
(13) Stephen Norris  stephen.norris@ualberta.ca  
(13) Sibel Erduran  sibel.erduran@bristol.ac.uk  
(14) Bryan A. Brown  brbrown@stanford.edu  
(14) Felicia Moore Mensah  moorefe@exchange.tc.columbia.edu  
(14) Carolyn S. Wallace  Carolyn.Wallace@indstate.edu
Support Team:

Executive Director: Bill Kyle  bill_kyle@umsl.edu
Annual Meeting Coordinator: Robin Turner  rturner@drohanmgmt.com
Director of Electronic Services: Robin Turner  rturner@drohanmgmt.com
Program/Scheduling Coordinator: Toni Sondergeld  tonis519@aol.com
JRST Co-Editor: Angela Calabrese Barton  aeb@msu.edu
JRST Co-Editor: Joseph Krajeck  krajcik@msu.edu
E-NARST news Co-Editor: Jan van Driel  Driel@iclon.leidenuniv.nl
E-NARST news Co-Editor: Carolyn S. Wallace  Carolyn.Wallace@indstate.edu
NARST Liaison to NSTA: Troy Sadler  sadler6@missouri.edu

Awards Committee

Chair:
(13) Xiufeng Liu  xliu5@buffalo.edu

Members:
NARST Outstanding Paper Award Committee Selection Co-Chairs
(13) Brian Gerber  blgerber@valdosta.edu
(13) Wendy Michelle Frazier  wfrazier@gmu.edu

Outstanding Doctoral Research Award Selection Committee Co-Chairs
(12) Michael Ford  mjford@pitt.edu
(13) Judith Lederman  ledermanj@iit.edu

JRST Award Selection Committee Co-Chairs
(12) Barbara Buckley  bbuckle@wested.org
(13) Anil Banerjee  banerjee_anil@colstate.edu

Early Career Research Award Selection Committee Co-Chairs
(13) Grady Venville  grady.venville@uwa.edu.au
(13) Maria Varelas  mvarelas@uic.edu

Distinguished Contributions in Research Award Committee Co-Chairs
(12) Peter Hewson  pwhewson@wisc.edu
(13) Jonathan Osborne  osbornej@stanford.edu

Narst Outstanding Paper Award Selection Committee

Co-Chairs:
(13) Brian Gerber  blgerber@valdosta.edu
(13) Wendy Michelle Frazier  wfrazier@gmu.edu

Members:
(12) Demet Kirbulut  kibirulut@metu.edu.tr
(12) Ava Zeineddin  zeineddi@illinois.ed
(12) Soon-Hye Park  soonbye-park@uiowa.edu
(12) Lisa Martin-Hansen  lmartinhansen@gsu.edu
(12) Meg Blanchard  meg_blanchard@ncsu.edu
(12) Kelly Riedinger  kellyriedinger@gmail.com
(12) Edmund A. Marek  emarek@ou.edu
(13) Kristy Loman Chiodo  klomanchiodo@verizon.net
(13) Issam Hafez Abi-El-Mona  abi-el-mona@rowan.edu
(13) Gouranga Saha  SahaG@lincolnlu.edu
(13) Terry Arambula-Greenfield  tarambulagreenfield@csumb.edu
(13) Leila Amiri  lamiri@mail.usf.edu
(14) Franz Bogner  Franz.Bogner@uni-bayreuth.de
(14) Hayat Hokayem  alhokaye@msu.edu
(14) Pam Cantrell  pamela_cantrell@byu.edu
(14) Mahsa Kazempour  muk30@psu.edu
(14) Anna Jober  Anna.Jobber@mah.se
(14) Michelle L. Klosterman  klostenml@wfu.edu
(14) Cynthia C. Minchew Deaton  edeaton@clemson.edu
Outstanding Doctoral Research Award Selection Committee

Co-Chairs:
(12) Michael Ford mjford@pitt.edu
(13) Judith Lederman ledermanj@iit.edu

Members:
(12) Brian Williams bawilli@gsu.edu
(12) Michelle Cook mcook@clemson.edu
(12) Victor Sampson vsampson@fsu.edu
(12) Barbara Hug bhug@illinois.edu
(12) Fred Finley finle001@umn.edu
(13) Janice Anderson anderj@email.unc.edu
(13) Hasan Deniz hasan.deniz@unlv.edu
(13) Wendy Michelle Frazier wfrazier@gmu.edu
(14) Noemi Waight nwaight@buffalo.edu
(14) Margaret Blanchard mcg Blanchard@ncsu.edu
(14) Maria Evagorou mariaevagorou@gmail.com
(14) Diane Ketelhut djk@umd.edu
(14) Ross Nehm RNehm@che.osu.edu

JRST Award Selection Committee

Co-Chairs:
(12) Barbara Buckley bbuckle@wested.org
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(14) Neporeha Cone conen1@nku.edu
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(13) Grady Venville  grady.venville@uwa.edu.au
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Executive Director: Bill Kyle  bill_kyle@umsl.edu
Awards Committee Chair: Xiufeng Liu  xliu5@buffalo.edu

Distinguished Contributions to Science Education through Research Award Committee

Co-Chairs:
(12) Peter Hewson  pwhewson@wisc.edu
(13) Jonathan Osborne  osbornej@stanford.edu

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(12) Nancy Brickhouse  nbrick@udel.edu
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(13) Dale Baker  dale.baker@asu.edu
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Executive Director: Bill Kyle  bill_kyle@umsl.edu
Awards Committee Chair: Xiufeng Liu  xliu5@buffalo.edu
Equity And Ethics Committee

Co-Chairs:
(12) Julie Bianchini  jbianchi@education.ucsb.edu
(14) Felicia Moore Mensah  moorefe@exchange.tc.columbia.edu

Members:
(12) Doris B. Ash  dash5@ucsc.edu
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(14) Regina Wragg  wragg@biol.sc.edu
(14) Deborah Roberts-Harris  drobert1@umd.edu

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External Policy And Relations Committee

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(13) John Falk  falkj@science.oregonstate.edu

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Chair - International Coordinator:
(13) Sibel Erduran  sibel.erduran@bristol.ac.uk

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(14) Christina Siry  christina.siry@uni.lu
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(14) Meredith Anne Park Rogers  mparkrog@indiana.edu
(14) Eva Erdoesne Toth  Eva.Toth@mail.wvu.edu

Ex-Officio:
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Executive Director: Bill Kyle  bill_kyle@umsl.edu
Membership And Elections Committee

Co-Chairs:
(12) Renee Schwartz  r.schwartz@wmich.edu
(14) Bryan A. Brown  brbrown@stanford.edu
Past President: Dana Zeidler  zeidler@coedu.usf.edu

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(12) May Hung May Cheng  maycheng@ied.edu.hk
(13) Jomo Mutegi  jmutegi@iupui.edu
(13) Kathryn Drago  kdrago@umich.edu
(13) Reizelle Barreto  rbarreto@towson.edu
(14) Eileen R. Carlton Parsons  rparsons@email.unc.edu
(14) Yehudit Judy Dori  yjdori@technion.ac.il
(14) Mike Smith  smith_mu@mercer.edu

Ex-Officio:
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Executive Director: Bill Kyle  bill_kyle@umsl.edu
Equity and Ethics Committee Advisor: Doris B. Ash  dash5@ucsc.edu
International Committee Advisor: Deniz Peker  dpeker@vt.edu

Program Committee

Co-Chairs:
President: J. Randy McGinnis  jmcginni@umd.edu
President-elect: Sharon Lynch  slynch@gwu.edu
Support: Toni Sondergeld  tonis519@aol.com

Members (Strand Co-Coordinators):

Strand 1: Science Learning, Understanding, and Conceptual Change
(12) Anat Yarden  anat.yarden@weizmann.ac.il
(13) Michelle Cook  mcook@g.clemson.edu

Strand 2: Science Learning: Contexts, Characteristics and Interactions
(12) Lisa A. Donnelly  ldonnell@kent.edu
(13) Amy Taylor  taylorar@uncw.edu

Strand 3: Science Teaching—Primary School (Grades preK-6)
(12) Rebecca Monhardt  rebecca.monhardt@loras.edu
(13) Nicole Glen  nicole.glen@bridgew.edu

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(12) Anna Lewis  arlewis@csl.usf.edu
(13) Sara Salloum  sara.salloum@liu.edu

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(12) Linda Keen-Rocha  keenrocha.usfedu@yahoo.com
(13) Sanghee Choi  schoi6@memphis.edu

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(12) Sandra Martell  smartell@uwm.edu
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(13) Jacqueline McDonough  jtmcdonnough@vcu.edu
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(13) Danielle Dani  dani@ohio.edu

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(13) Kim Charmatz  kcharmat@daemen.edu

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NARST Liaison to NSTA: Troy Sadler  sadlert@missouri.edu
# NARST Annual International Conference

## Schedule at a Glance - 2012

**JW Marriott**  
**Indianapolis, IN USA**

<table>
<thead>
<tr>
<th>Event</th>
<th>Room</th>
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</thead>
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<tr>
<td><strong>Saturday, March 24</strong></td>
<td></td>
</tr>
<tr>
<td>7:30 AM – 5:00 PM</td>
<td>NARST Executive Board Meeting #1</td>
</tr>
<tr>
<td>2:00 PM - 5:00 PM</td>
<td>Conference Registration</td>
</tr>
<tr>
<td>8:00 AM – 12:00 PM</td>
<td>NARST Executive Board Meeting #2</td>
</tr>
<tr>
<td>7:30 AM – 12:00 PM</td>
<td>Registration</td>
</tr>
</tbody>
</table>
| 8:00 AM – 12:00 PM | Pre-Conference Workshop #1: Equity and Ethics Committee  
Title: Enacting Equity and Social Justice in Science Education Careers  
Organizers: Alicia Trotman, Michigan State University and  
Regina Wragg, University of South Carolina  
Participants: Julie Bianchini, University of California-Santa Barbara,  
Heidi Carbone, University of North Carolina-Greensboro; Christopher Emdin,  
Teachers College, Columbia University; Felicia Moore Mensah, Teachers College,  
Columbia University; Joi Merritt, Michigan State University; Deb Morrison,  
University of Colorado at Boulder; Deborah Roberts-Harris, University of New Mexico;  
Takumi Sato, Michigan State University; Blakely Tsurusaki, University of Washington;  
and Bhaskar Upadhyay, University of Minnesota |
| 8:00 AM – 12:00 PM | Pre-Conference Workshop #2: Publications Committee  
Title: Developing High Quality Reviews for the *Journal of Research in Science Teaching*  
Presenters: Angie Calabrese Barton, Joe Krajcik, Bob Geier, and JRST Associate Editors |
| 8:00 AM – 12:00 PM | Pre-Conference Workshop #3: Research Committee  
Title: A Cognitive Model for Implementing Knowledge: Moving Research into Practice  
Presenters: Dale R. Baker and Heather Pacheco, Arizona State University |
| 8:00 AM – 12:00 PM | Pre-Conference Workshop #4: Research Committee  
Title: Introduction to instrument development and evaluation in science education  
Presenters: Irene Neumann and Knut Neumann, Leibniz-Institute for Science and  
Mathematics Education (IPN); William Boone, Miami University; and  
Ross Nehm, Ohio State University |
| 12:00 PM – 1:00 PM | Lunch On your own- various restaurants |
| 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 – 6:00 PM | Plenary Session # 1  
Paul Cobb, Vanderbilt University and  
Kara Jackson, McGill University  
Towards an Empirically-Grounded Theory of Action for  
Improving the Quality of Teaching Subject Matter at Scale |
| 6:00 PM – 7:00 PM | Mentor-Mentee Nexus |
| 6:00 PM - 7:00 PM | Research Interest Groups (RIGs) Meetings  
The Continental and Diasporic Africa in Science Education |
| 7:00 PM – 9:30 PM | Presidential / Welcome Reception  
(Appetizers served and cash bar) |

**Sunday, March 25**

<table>
<thead>
<tr>
<th>Event</th>
<th>Room</th>
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<tbody>
<tr>
<td>7:30 AM – 5:00 PM</td>
<td>Room 201 and 202</td>
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<tr>
<td>2:00 PM - 5:00 PM</td>
<td>White River Registration</td>
</tr>
<tr>
<td>8:00 AM – 12:00 PM</td>
<td>Room 201 and 202</td>
</tr>
<tr>
<td>7:00 AM – 5:00 PM</td>
<td>White River Registration</td>
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<tr>
<td>8:00 AM – 12:00 PM</td>
<td>Room 101</td>
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<tr>
<td>8:00 AM – 12:00 PM</td>
<td>Room 102</td>
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<tr>
<td>8:00 AM – 12:00 PM</td>
<td>Room 103</td>
</tr>
<tr>
<td>8:00 AM – 12:00 PM</td>
<td>Room 104</td>
</tr>
<tr>
<td>12:00 PM – 1:00 PM</td>
<td>White River Ballroom Foyer</td>
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<tr>
<td>1:00 PM – 2:30 PM</td>
<td>White River Ballroom A - E</td>
</tr>
<tr>
<td>2:45 PM – 4:00 PM</td>
<td>Room 101</td>
</tr>
<tr>
<td>4:00 PM – 4:30 PM</td>
<td>Room 103</td>
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<tr>
<td>4:30 PM – 6:00 PM</td>
<td>White River Ballroom F - J</td>
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<tr>
<td>Event</td>
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<tr>
<td><strong>Monday, March 26</strong></td>
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<tr>
<td>6:00 AM - 7:15 AM</td>
<td>The INDY 5000 (5K) Science Education Fun Run / Walk</td>
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<tr>
<td>7:30 AM – 8:15 AM</td>
<td>Committee Meetings</td>
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<tr>
<td>7:00 AM – 5:00 PM</td>
<td>Registration</td>
</tr>
<tr>
<td>8:30 AM – 10:00 AM</td>
<td>Concurrent Session # 3</td>
</tr>
<tr>
<td>10:15 AM – 11:45 AM</td>
<td>Concurrent Session # 4</td>
</tr>
<tr>
<td>12:00 – 1:00 PM</td>
<td>NARST Business Meeting</td>
</tr>
<tr>
<td>(Box lunch provided for 1st 100 attendees who sign up)</td>
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</tr>
<tr>
<td>12:00 - 1:00 PM</td>
<td>Lunch On your own - various restaurants</td>
</tr>
<tr>
<td>1:15 PM – 2:45 PM</td>
<td>Concurrent Session # 5</td>
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<tr>
<td>2:45 PM - 3:15 PM</td>
<td>Break</td>
</tr>
<tr>
<td>3:15 PM - 4:15 PM</td>
<td>Concurrent Session # 6A: Poster Session</td>
</tr>
<tr>
<td>4:15 PM - 5:15 PM</td>
<td>Concurrent Session # 6B: Poster Session</td>
</tr>
<tr>
<td>5:30 PM – 7:00 PM</td>
<td>Graduate Student Forum</td>
</tr>
<tr>
<td>6:30 PM – 8:30 PM</td>
<td>JRST Editorial Board Meeting/Reception</td>
</tr>
<tr>
<td>(Meeting open/Reception by invitation)</td>
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</tr>
<tr>
<td>7:00 PM - 8:00 PM</td>
<td>Graduate Student and Early Career Scholars</td>
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<tr>
<td>(Informal social - on your own)</td>
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<tr>
<td><strong>Tuesday, March 27</strong></td>
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</tr>
<tr>
<td>7:00 AM – 8:15 AM</td>
<td>Committee Meetings</td>
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<tr>
<td>7:00 AM – 5:00 PM</td>
<td>Registration</td>
</tr>
<tr>
<td>8:30 AM – 10:00 AM</td>
<td>Concurrent Session # 7</td>
</tr>
<tr>
<td>10:00 AM - 10:30 AM</td>
<td>Break Foyer -</td>
</tr>
<tr>
<td>10:30 AM – 12:00 PM</td>
<td>Plenary Session #2: Student Diversity and Science Education Research in a Global Context: Research Agenda and the Role of NARST</td>
</tr>
<tr>
<td>12:00 PM – 2:00 PM</td>
<td>Awards Luncheon</td>
</tr>
<tr>
<td>2:15 PM – 3:45 PM</td>
<td>Concurrent Session # 8</td>
</tr>
<tr>
<td>4:00 PM - 5:30 PM</td>
<td>Concurrent Session # 9</td>
</tr>
<tr>
<td>5:45 PM – 6:45 PM</td>
<td>New Researcher and Junior Faculty Early Career Discussion</td>
</tr>
<tr>
<td>6:00 PM – 8:00 PM</td>
<td>Springer Reception (By invitation only)</td>
</tr>
<tr>
<td>7:00 PM – 9:00 PM</td>
<td>Equity Dinner Off-site</td>
</tr>
<tr>
<td>Buca di Beppo Italian Restaurant (Maximum attendance: 90) Dinner, including tax and gratuity, is $35. Please note: You must register for this event with your Advance Conference Registration.</td>
<td></td>
</tr>
<tr>
<td>8:00 PM – 10:30 PM</td>
<td>Social</td>
</tr>
<tr>
<td><strong>Wednesday, March 28</strong></td>
<td></td>
</tr>
<tr>
<td>7:00 AM – 8:15 AM</td>
<td>Strand Meetings</td>
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<tr>
<td>7:00 AM – 12:00 PM</td>
<td>Registration</td>
</tr>
<tr>
<td>8:30 AM – 10:00 AM</td>
<td>Concurrent Session # 10</td>
</tr>
<tr>
<td>10:15 AM - 11:45 AM</td>
<td>Concurrent Session # 11</td>
</tr>
<tr>
<td>12:00 PM – 1:00 PM</td>
<td>Lunch On your own - various restaurants</td>
</tr>
<tr>
<td>1:00 PM – 2:30 PM</td>
<td>Concurrent Session # 12</td>
</tr>
<tr>
<td>2:45 PM - 4:15 PM</td>
<td>Concurrent Session # 13</td>
</tr>
<tr>
<td>5:00 PM – 10:00 PM</td>
<td>NARST Executive Board Meeting #3</td>
</tr>
</tbody>
</table>
The first NSTA STEM Forum & Expo will bring together nationally renowned STEM experts and practitioners and hands-on educators interested in learning about successful approaches and implementation of Science, Technology, Engineering, and Mathematics education into our schools and districts. STEM best practices, content, and integration processes are critical aspects for creating well-trained elementary and middle school educators who will need to radically increase student literacy in these STEM subjects. Join this very important discussion on STEM.

Who Should Attend?

- K–8 educators who want to expand their understanding of STEM and learn how to integrate it into their own classrooms and schools.
- High school and college educators knowledgeable about what secondary and college-level students need to be successful in STEM course work.
- Stakeholders and administrators who must educate their teaching staff on the most current and successful STEM practices.

For more information, visit www.nsta.org/stemforum
7:30am - 5:00pm

NARST Executive Board Meeting Session #1
7:30am – 5:00pm, Room 201 & 202

Conference Registration
2:00pm – 5:00pm, White River Registration
Just visit www.tandfonline.com/r/narst-2012 for 14 days free access to the following journals:

- Applied Environmental Education & Communication
- Canadian Journal of Science, Mathematics, & Technology Education
- Environmental Education Research
- European Journal of Engineering Education
- International Journal of Mathematical Education in Science & Technology
- International Journal of Science Education
- International Journal of Science Education, Part B: Communication and Public Engagement
- Journal of Biological Education
- Journal of Environmental Education
- Mathematical Thinking and Learning
- Research in Science & Technological Education
- Science Activities
- Studies in Science Education
- Journal of the Learning Sciences
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Science Learning and Instruction
Taking Advantages of Technology to Promote Knowledge Integration
By Marcia C. Linn & Bat-Sheva Eylon
Pb: 978-0-8058-6055-9

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Conference Registration
7:00am – 5:00pm, White River Registration

NARST Executive Board Meeting Session #2
7:30am – 12:00pm, Room 201 & 202

Pre-Conference Workshops
8:00am – 12:00pm

W1. Pre-Conference Workshop—Equity and Ethics Committee Sponsored (Free)
Enacting Equity and Social Justice in Science Education Careers
8:00am – 12:00pm, Room 101
Organizers:
Alicia Trotman, Michigan State University
Regina Wragg, University of South Carolina
Participants:
Julie Bianchini, University of California-Santa Barbara
Heidi Carlone, University of North Carolina-Greensboro
Christopher Emdin, Teachers College, Columbia University
Felicia Moore Mensah, Teachers College, Columbia University
Joi Merritt, Michigan State University
Deb Morrison, University of Colorado at Boulder
Deborah Roberts-Harris, University of New Mexico
Takumi Sato, Michigan State University
Blakely Tsurusaki, University of Washington
Bhaskar Upadhyay, University of Minnesota

W2. Pre-Conference Workshop—Publications Committee Sponsored (Free)
Developing High Quality Reviews for the Journal of Research in Science Teaching
8:00am – 12:00pm, Room 102
Angela M. Calabrese-Barton, Michigan State University
Joseph S. Krajcik, Michigan State University
Bob Geier, Michigan State University

W3. Pre-Conference Workshop—Research Committee Sponsored ($50 Registration Fee)
A Cognitive Model for Implementing Knowledge: Moving Research into Practice
8:00am – 12:00pm, Room 103
Dale R. Baker, Arizona State University
Heather Pacheco, Arizona State University

W4. Pre-Conference Workshop—Research Committee Sponsored ($25 Registration Fee)
Introduction to Instrument Development and Evaluation in Science Education
8:00am – 12:00pm, Room 104
Irene Neumann, Leibniz-Institute for Science & Mathematics Education (IPN)
Knut Neumann, Leibniz-Institute for Science & Mathematics Education (IPN)
William Boone, Miami University
Ross Nehm, Ohio State University

Lunch—On Your Own
12:00pm – 1:00pm

Concurrent Session #1
1:00pm – 2:30pm

Presidential Sponsored Session
The Challenge of 21st Century Science Education to Offer New Insights for a Diverse Global Community: Re-Imagining the Use of Participants’ Drawings as a Data Collection Strategy
1:00pm – 2:30pm, Room 313
Presenters:
J. Randy McGinnis, NARST President, University of Maryland, jmcginni@umd.edu
Phyllis Katz, University of Maryland
Gili Marbach-Ad, University of Maryland
Wayne Breslyn, University of Maryland
Kelly A. Riedinger, University of North Carolina Wilmington
Nathan Carnes, University of South Carolina
Sue D. Tunnidcliffe, Institution of Education, University of London
Michael J. Reiss, Institute of Education, University of London
Chris Astall, University of Canterbury

Strand 1: Science Learning, Understanding and Conceptual Change
Related Paper Set - Examining Student Learning of Science through Engineering and Engineering Design
1:00pm – 2:30pm, Room 310

Think-aloud Protocol Analysis as a Measure of Students’ Science Learning through Design Assessment
Todd R. Kelley, Purdue University, trkelley@purdue.edu
Brenda M. Capobianco, Purdue University
Facilitating and Assessing Science Learning Within an Engineering Design-Focused Project-Based Learning Curriculum
Mike Ryan, Georgia Institute of Technology, mike.ryan@ceismc.gatech.edu
Marion Usselman, Georgia Institute of Technology

Elementary Student Knowledge Tests: A Grade-level Specific Pre/Post Assessment of Science, Technology, and Engineering Design Process Concepts
Heidi Diefes-Dux, Purdue University, hdeifes@purdue.edu
Melissa Dyehouse, Purdue University

A Mixed Methods Approach to Measuring Learning through Engineering
Kristen B. Wendell, University of Massachusetts Boston, kbwendell@gmail.com
Meredith Portsmore, Tufts University

Strand 2: Science Learning: Contexts, Characteristics and Interactions
STEM Topics
1:00pm – 2:30pm, Room 302
Presider:
Toni A. Sondergeld, Bowling Green State University

Video Research as a Roadway to Re-imagining the Promise and Potential of Science Education Research
Rowhea M. Elmesky, Washington University in St Louis, relmesky@wustl.edu

Teacher/Student On-Line Interaction: Role-Playing Scientists to Augment Hands-On Lab. Work in Classrooms
Carol A.B. Rees, Thompson Rivers University, British Columbia, Canada, crees@tru.ca
Annemarie Petrasek, Huron Perth Catholic District School Board, Ontario, Canada

Development of a Student Self-Evaluation Instrument in Inquiries
Saskia Vanderjagt, Vrije Universiteit, Amsterdam, The Netherlands, s.vanderjagt@vum.nl
Lisette E. Vanrens, Vrije Universiteit, Amsterdam, The Netherlands
Herman H. Schalk, Vrije Universiteit, Amsterdam, The Netherlands
Albert Pilot, University of Utrecht, Fisme
Jos J. Beishuizen, Vrije Universiteit, Amsterdam, The Netherlands

Do We Have a Common STEM Pedagogy? A Comparative Case Study Analysis
Maya Israel, University of Cincinnati, maya.israel@uc.edu
Helen M. Meyer, University of Cincinnati

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies
Strand Sponsored Session- Climate Change Education: Curriculum, Controversy, Culture, and Critical Review
1:00pm – 2:30pm, Room 303
Presenter:
Anna R. Lewis, University of South Florida, arlewis@usf.edu
Susan Buhr, University of Colorado
Julie Thomas, Oklahoma State University
Anne L. Kern, University of Idaho
Ardice Hartry, UC Berkeley

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies
Basic Literacy Skills & Science
1:00pm – 2:30pm, Room 305
Presider:
Saouma B. Boujaoude, American University of Beirut

The Effect of the Science Writing Heuristic on Elementary Students’ ITBS Score: A Longitudinal Study
ChingMei Tseng, University of Iowa, chingmei.tseng@gmail.com
Lori Norton-Meier, University of Louisville
Brian M. Hand, University of Iowa

The Influence of Non-Traditional Writing Task and Audience on Students’ Understanding of Mixture Concept
Sevgi Kingir, Selcuk University, kingirsevgi@gmail.com
Murat Gunel, Ahi Evran University

Developing Science Literacy: Investigating Scaffolds that Assist Students in Writing about Science Inquiry Tasks
Timothy A. Collins, Gresham Barlow School District, collins19@gresham.k12.or.us
Lawrence B. Flick, Oregon State University

7th Grade Students’ Decisions about Limiting Resources after Writing-to-Learn Instruction
Meena M. Balgopal, Colorado State University, Meena.Balgopal@colostate.edu
Lynn Gilbert, Conrad Ball Middle School
Pam Breitbarth, Conrad Ball Middle School
Alison M. Wallace, Minnesota State University Moorhead
The Comparison of Image-text Relations in High School Biology Textbooks between Australia and Taiwan
Yun-Ping Ge, National Changhua University, Taiwanunpingge@yahoo.com.tw
Len Unsworth, University of New England, Australia
Chang-Hung Chung, National Changhua University, Taiwan
Huey-Por Chang, National Changhua University, Taiwan
Kuo-Hua Wang, National Changhua University, Taiwan

Strand 5: College Science Teaching and Learning (Grades 13-20)
Related Paper Set- Systems Thinking in Introductory Biology
1:00pm – 2:30pm, Room 304
Discussants:
Jennifer L. Momsen, North Dakota State University
Elena Bray Speth, Saint Louis University
Joseph T. Dauer, Michigan State University

Building a Rationale for the Integration of Systems Models into College-level Biology Teaching and Learning
Tammy M. Long, Michigan State University, longta@msu.edu
Jennifer L. Momsen, North Dakota State University
Elena Bray Speth, Saint Louis University
Joseph T. Dauer, Michigan State University
Sara A. Wyse, Bethel University

Change in Correctness and Complexity of Student-constructed Models During a Course
Joseph T. Dauer, Michigan State University, jdauer@msu.edu
Tammy M. Long, Michigan State University
Jennifer L. Momsen, North Dakota State University
Elena Bray Speth, Saint Louis University
Kristen Kostelnik, Michigan State University

From Linear to Complex: How Students Organize Models and Explanations of Causal Relationships in Biological Systems
Elena Bray Speth, Saint Louis University, espeth@slu.edu
Matthew Dirnbeck, Saint Louis University
Jennifer L. Momsen, North Dakota State University
Tammy Long, Michigan State University

Systems Models, Systems Thinking, and Content Knowledge in an Introductory Biology Course
Jennifer L. Momsen, North Dakota State University, Momsen.Jennifer@ndsu.edu
Sara A. Wyse, Bethel University
Elena Bray Speth, Saint Louis University
Kristen Kostelnik, Michigan State University
Joseph T. Dauer, Michigan State University
Tammy Long, Michigan State University

Strand 5: College Science Teaching and Learning (Grades 13-20)
Improving Conceptual Understanding
1:00pm – 2:30pm, Room 309
Presider:
Huseyin Colak, Northeastern Illinois University

Getting to the CoRe of It! Scaffolding Undergraduates Understanding of Geology Using Content Representation Matrices
Meredith A. Park Rogers, Indiana University, mparkrog@indiana.edu
Heidi L. Wiebke, Indiana University
Adam V. Maltese, Indiana University
Joseph A. Harsh, Indiana University
Ingrid S. Weiland, University of Louisville
Christina Melki, Indiana University

How Do Ideas about Conventional Time and Large Numbers Influence Students’ Understanding of Deep (Geologic) Time?
Kim A. Cheek, University of Ciputra, cheek.kim8@gmail.com

How Do Biology Undergraduates “Explain” Photosynthesis? Investigating Student Responses to Different Constructed Response Question Stems
Michele M. Weston, Michigan State University, westonmi@msu.edu
Casey Lyons, Michigan State University
John Merrill, Michigan State University
Mark Urban-Lurain, Michigan State University
Kevin Haudek, Michigan State University

Identification Student Misconceptions of Chemistry Diagrams and the Reinforcement of These Misconceptions by Chemistry Textbooks
Bryna Kumi, University of Maryland, College Park, bclover@umd.edu
Bonnie L. Dixon, University of Maryland, College Park
Felicia Bartlett, University of Maryland, College Park

Strand 7: Pre-service Science Teacher Education
Learning Science Teacher Practices
1:00pm – 2:30pm, Room 306
Presider:
Sheryl L. Mcglamery, University of Nebraska

Preservice Science Teachers’ Use of Inscriptions In Their Peer Teaching Activity
Arzu Tanis Ozcelik, The Pennsylvania State University, axt252@psu.edu
Scott P. McDonald, The Pennsylvania State University
Sunday, March 25, 2012

Using “Approximations of Practice” to Bridge Theory and Practice in an Elementary Science Methods Course
Ashima M. Shah, Harvard University, ashah@mclean.harvard.edu

Using Specialized Instruction to Develop Cognitive Reasoning Abilities in Teacher Candidates
Kathleen M. Koenig, University of Cincinnati, koenigkmi@ucmail.uc.edu
Lei Bao, Ohio State University
Melissa Schen, Wright State University

Strand 8: In-service Science Teacher Education
Promoting Language and Literacy in the Science Classroom
1:00pm – 2:30pm, Room 105

We Are All Talking: A Whole-School Approach to Professional Development for Teachers of English Learners
Lauren M. Shea, University of CA - Irvine, lshea@uci.edu
Therese B. Shanahan, University of California - Irvine

Elementary Teacher Beliefs about the Role of Language Literacy Instruction in a Science Lesson Sequence
Sandie M. Grinnell, Mount Elden Middle School, sgrinnell@fusd1.org
Barbara A. Austin, Wittenberg University

Synergistically Aligning Cogenerative Dialogues with Culturally Responsive Teaching and Learning
Wesley Pitts, Lehman College, CUNY, wesley.pitts@lehman.cuny.edu
Gillian U. Bayne, Lehman College CUNY

Teachers’ Integration of Science and Language Instruction in Multilingual Classrooms: Implications for In-service Education
Christina Siry, University of Luxembourg, chrisnir@gmail.com
Joëlle Vlassis, The University of Luxembourg

Strand 9: Reflective Practice
Reflective Practice in Professional Development and Teacher Education
1:00pm – 2:30pm, Room 301

Teacher Professional Development Delivery and its Impact on Higher Education Faculty and their Institutions
Dominike Merle-Johnson, University of Missouri - Columbia, dmk99@mizzou.edu
Ya-Wen Cheng, University of Missouri
Rose M. Marra, University of Missouri
Anna M. Waldron, University of Missouri

The Nature of Elementary Science Teachers Reflections When Working with English Language Learners
Cynthia C. Deaton, Clemson University, cdeaton@clemson.edu

Working Collaboratively with Teacher-researchers to Investigate What Young Children Know and Can Do in Science
Mary E. Hobbs, University of Texas at Austin, maryhobbs@mail.utexas.edu
Robert A. Williams, University of Texas at Austin
James P. Barufaldi, University of Texas at Austin
Assessing the Reflective Practice of Prospective Teachers Through Written Reflections
Geraldine L. Cochran, Florida International University,
geochl001@fiu.edu
Eric Brewe, Florida International University
Laird H. Kramer, Florida International University
David Brookes, Florida International University

Strand 10: Curriculum, Evaluation, and Assessment
Related Paper Set - Using Curriculum to Change How Teachers Teach Science and Students Learn Science
1:00pm – 2:30pm, Room 308

Developing Research-Based Science Curricula: An Iterative Research and Design Process
Pamela Van Scotter, BSCS, pvanscotter@bscs.org
Janet Carlson, BSCS
Susan M. Kowalski, BSCS
Paul M. Beardsley, BSCS
Brooke N. Bourdelat-Parks, BSCS
Stephen R. Getty, BSCS
Betty Stennett, BSCS

Key Features of Research-Based Science Curricula: Theory and Application
Brooke N. Bourdelat-Parks, BSCS, bbparks@bscs.org
Janet Carlson, BSCS
Pamela Van Scotter, BSCS
Susan M. Kowalski, BSCS
Paul M. Beardsley, BSCS
Stephen R. Getty, BSCS
Betty Stennett, BSCS

Using Research-Based Curricula to Change how Teachers Teach Science
Susan M. Kowalski, BSCS, skowalski@bscs.org
Janet Carlson, BSCS
Pamela Van Scotter, BSCS
Paul M. Beardsley, BSCS
Brooke N. Bourdelat-Parks, BSCS
Stephen R. Getty, BSCS
Betty Stennett, BSCS

Using Research-Based Curricula to Change how Students Learn Science
Paul M. Beardsley, BSCS, pbeardsley@bscs.org
Janet Carlson, BSCS
Pamela Van Scotter, BSCS
Susan M. Kowalski, BSCS
Brooke N. Bourdelat-Parks, BSCS
Stephen R. Getty, BSCS
Betty Stennett, BSCS

Strand 11: Cultural, Social, and Gender Issues
Girls Aspirations in Science: Bridging the Gap between Students and Science
1:00pm – 2:30pm, Room 107
Presider:
Maria S. Rivera Maulucci, Barnard College

Girls’ Gateways to Science and Mathematics Education in Cameroon
Anne E. Emerson, University of California at Santa Barbara,
aemerson@education.ucsb.edu
Danielle Boyd Harlow, University of California at Santa Barbara

The Importance of Individual Interpretations of Cultural Understandings of Gender by Female Undergraduate Science Majors in Explaining Trends of Underrepresentation
Rachel E. Wilson, Appalachian State University, wilsonre3@appstate.edu
Julie M. Kittleson, University of Georgia

“It’s about Relationships”: Girls Imaginings of Science and Self in an Afterschool Program
Allison J. Gonsalves, Universite de Montreal, allison.gonsalves@umontreal.ca
Alice Carvalho, Universite de Montreal
Jrene Rahm, Universite de Montreal

Factors Influencing Female Students’ Participation in a Pre-engineering and Engineering Program
Brenda Brand, Virginia Tech, bbrand@vt.edu
Mary Kasarda, Associate Professor in Mechanical Engineering

Strand 12: Educational Technology
Strand Sponsored Session - Serious Educational Games: Research Experiences from National Science Foundation Funded Projects
1:00pm – 2:30pm, Room 101
Presider:
James Minogue, North Carolina State University

Presenters:
Leonard A. Annetta, George Mason University, lannetta@gmu.edu
Douglas B. Clark, Vanderbilt University
Diane J. Ketelhut, University of Maryland
Troy D. Sadler, University of Missouri
James Minogue, North Carolina State University
Strand 13: History, Philosophy, and Sociology of Science
Teacher Education in HOS, POS & SOS
1:00pm – 2:30pm, Room 102
Presider:
Catherine E. Milne, New York University

Experiencing Research for Teaching Science
Renee S. Schwartz, Western Michigan University, rschwartz@wmich.edu
Cathy K. Northcutt, Western Michigan University
Susan Stapleton, Western Michigan University

The Interaction of Knowledge and Pedagogical Decisions in Teaching Nature of Science
Judith S. Lederman, Illinois Institute of Technology, ledermanj@iit.edu
Stephen A. Bartos, Illinois Institute of Technology
Daniel Z. Meyer, Illinois Institute of Technology
Norman G. Lederman, Illinois Institute of Technology
Allison Antink Meyer, Illinois Institute of Technology

Developing Preservice Teachers’ NOS Conceptions and Commitment to NOS Instruction Using a Process Skill-based Approach
Bridget K. Mulvey, University of Virginia, bkm2x@virginia.edu
Jennifer Maeng, University of Virginia
Randy L. Bell, University of Virginia

Strand 14: Environmental Education
Related Paper Set - Young People and the Environment: International Perspectives on the Effect of Environmental Education Initiatives
1:00pm – 2:30pm, Room 103
Presider:
Peter Van Petegem, University of Antwerp - IOIW

Eco-school Effectiveness: Children’s Environmental Values, Knowledge and Affections
Jelle Boeve-de Pauw, University of Antwerp, jelle.boevedepauw@ua.ac.be
Peter Van Petegem, University of Antwerp - IOIW

Environmental Education on Global Climate Change: Concept Mapping and the 2-MEV
Daniela Sellmann, University of Bayreuth, daniela.sellmann@uni-bayreuth.de
Franz X. Bogner, University of Bayreuth

Young Adolescents’ Views on Environmental Attitudes, Behaviors, and Identity: Seeking Truth, Adventure and Harmony
Bruce Johnson, University of Arizona, brucej@email.arizona.edu
Amanda Jaksha, University of Arizona
Elsa Schaub, University of Arizona
Constantinos C. Manoli, University of Cyprus

The Impact of Post-participation Reflection on Environmental Education Program Outcomes
Mat Duerden, Texas A & M University, duerden@tamu.edu
Peter Witt, Texas A & M University

Strand 15: Policy
Accountability Impacts on Science Education Policies
1:00pm – 2:30pm, Room 104
Presider:
Todd L. Hutner, The University of Texas at Austin

Pre-Service Science Teachers Beliefs about the Organizational Culture of Public Schools and Accountability
Todd L. Hutner, The University of Texas at Austin, thutner@gmail.com

When Good Intentions and Reality Meet: Large-Scale Reform of Science Teaching in Urban Schools With Predominantly Hispanic ELL Students
Carla C. Johnson, University of Cincinnati, johnsc2@ucmail.uc.edu
Virginia Bolshakova, Utah State University
Tammy Miller, University of Cincinnati

The Initial Impact of No Child Left Behind With a Focus on Time for Elementary Science and Equity in Science, Math, and Reading
George W. Griffith, Trego County Unified School District #208 WaKeeney, KS, scitcher@hotmail.com
Lawrence C. Scharmann, Florida State University

When Science is High Stakes: Variations among the States and the Effects on Reading and Math
Eugene Judson, Arizona State University, Eugene.Judson@asu.edu
Concurrent Session #2
2:45pm – 4:00pm

Awards Committee Sponsored Session
Distinguished Contributions in Research
2:45pm – 4:00pm, Room 313

Presiders:
Xiufeng Lin, State University of New York at Buffalo
Jonathan F. Osborne, Stanford University

Presenters:
Norman G. Lebederman, Illinois Institute of Technology

Strand 1: Science Learning, Understanding and Conceptual Change
Related Paper Set - Supporting Argumentation, Explanation, and Modeling Practices in Elementary and Middle School Classrooms
2:45pm – 4:00pm, Room 310

Presider:
Brian J. Reiser, Learning Sciences, Northwestern University

 Discussant:
Cynthia Passmore, University of California-Davis

A Framework for Supporting and Assessing Scientific Practices
Brian J. Reiser, Learning Sciences, Northwestern University, reiser@northwestern.edu
Abraham Lo, Learning Sciences, Northwestern University
Cynthia Passmore, University of California-Davis

Students’ Construction of Mechanistic Models Using Argumentation and Representation
Lisa Kenyon, Wright State University, lisa.kenyon@wright.edu
Amber Todd, Wright State University

Middle School Students Arguing About the Construction and Application of Models
Kathleen Crucet-Villavicencio, The University of Texas, Austin, kathleen.crucet@utexas.edu
Leema Berland, University of Texas, Austin

Fostering Elementary Students’ Productive Engagement in Scientific Modeling
Hamin Baek, Michigan State University, haminbaek@gmail.com
Christina V. Schwarz, Michigan State University
Li Zhan, Michigan State University
Mete Akcaoglu

How Do Different Classrooms Interpret Scientific Practices?
Monica Ko, Learning Sciences, Northwestern University, monlinko2008@u.northwestern.edu

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Related Paper Set - Connecting Expansive Framing to Transfer in a High School Biology Classroom
2:45pm – 4:00pm, Room 302

Discussants:
Maria Varelas, University of Illinois at Chicago
N. Sanjay Rebello, Kansas State University

Expansive Framing in a Biology Classroom: What Does it Look Like?
Sarah L. Perez, University of California, Berkeley, salperez128@hotmail.com
Danny X. Tan, University of California, Berkeley
Herman J. Rosas, University of California, Berkeley

Student Recognition of and Responses to Expansive Framing in a Biology Classroom
Xenia S. Meyer, University of California, Berkeley, xenia.meyer@berkeley.edu
Kathleen Zheng, University of California, Berkeley

Evidence of Transfer in an Expansively Framed Biology Classroom
Diane P. Lam, University of California, Berkeley, dianelam@berkeley.edu
Lloyd Goldwasser, University of California, Berkeley
Erica Naves, University of California, Berkeley

Student Perceptions and Uptake of Expansive Framing to Transfer: Qualitative and Quantitative Analyses
Randi A. Engle, UC-Berkeley, RAEngle@berkeley.edu
Maria Varelas, University of Illinois at Chicago
N. Sanjay Rebello, Kansas State University

Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies
The Nature of Science in Elementary School Classrooms
2:45pm – 4:00pm, Room 301

Presider:
Lloyd H. Barrow, University of Missouri

How do Elementary School Science Textbooks Present the Nature of Science?
Marianne Phillips, Texas A&M University, San Antonio, marianne.phillips@tamusa.tamus.edu
Julie Vowell, Texas Wesleyan University
Young H. Lee, University of Houston
Brian Plankis, Indiana University
Using History of Science to Teach the Nature of Science to Elementary School Students
Khadija Fouad, Indiana University, kfouad@indiana.edu
Heidi L. Wiebke, Indiana University
Valerie L. Akerson, Indiana University

The Portrayal of the Nature of Science in Early Childhood Physical Science Instructional Materials
Brandon Schrauth, Johnston Community School District, brandon.schrauth@johnston.k12.ia.us
Joanne K. Olson, Iowa State University

Strand 4: Science Teaching - Middle and High School (Grades 5-12): Characteristics and Strategies
Teaching Core Concepts in Science
2:45pm – 4:00pm, Room 303
Presider:
Patricia Friedrichsen, University of Missouri-Columbia

Examining the Challenges and Successes of an Accelerated Science and Math Program for High Potential Urban Middle School Students
Toni A. Sonderegger, Bowling Green State University, tsonger@bgsu.edu
Andrea R. Milner, Adrian College
Laurence J. Coleman, University of Toledo

Adolescent Peer-led Teaching: Improving Academic Performance and Retention
Rona M. Robinson-Hill, University of Missouri - St. Louis, Rona.Robinson-Hill@slps.org

A Novel Laboratory Method for Teaching K-12 Evolution
Brad Hughes, UCI, bhughes@uci.edu

Relevant and Popular Lessons and Scientific Literacy: Application of Modules from the European Project PARSEL
Georgios Tsaparis, University of Ioannina, Greece, gtsper@cc.uoi.gr
Euphrosyni Nakou, Secondary State Education, Greece

The Impact of a Professional Development Workshop on Rural STEM Teachers’ Self-Efficacy and Biofuels Knowledge
Kasey P.S. Goodpaster, Purdue University, scott66@purdue.edu
Omolola A. Adedokun, Purdue University
Lisa P. Kirkham, Purdue University
Peggy A. Ezrit, Purdue University
Kari L. Clase, Purdue University
Maureen McCann, Purdue University
Gabriela C. Weaver, Purdue University

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

Constructivism in Science Learning
2:45pm – 4:00pm, Room 304
Presider:
Yehudit Judy Dori, Technion-Israel Institute of Technology

Collaborative Group Testing: Communication and the Perceptions of Students in a Biotechnology Course for Non-Majors
Tina M. Roberts, University of Missouri-Columbia, robertsti@missouri.edu
Marcelle A. Siegel, University of Missouri-Columbia
Sharyn K. Freyermuth, University of Missouri-Columbia

Data Interpretation along the Novice – Expert Continuum
Joseph A. Harsh, Indiana University School of Education, jharsh@indiana.edu
Adam V. Maltese, Indiana University

Is DNA Alive? A Longitudinal Study of Conceptual Change through Targeted Innovative Instruction
Stephen B. Witzig, University of Missouri, sbwitzig@mail.missouri.edu
Sharyn K. Freyermuth, University of Missouri
Marcelle A. Siegel, University of Missouri
Kemal Izci, University of Missouri
J. C. Pires, University of Missouri

Constructivism in Context: The Effects of Class Size and Student Motivation on Student Learning and Satisfaction in Four Different Classrooms
Emily Borda, Western Washington University, bordae@wwu.edu
Mathew Lockett, Western Washington University
Siri Wuotila, Western Washington University

Strand 5: College Science Teaching and Learning (Grades 13-20)
The Nature of Science
2:45pm – 4:00pm, Room 309
Presider:
Dominike Merle-Johnson, University of Missouri - Columbia

Nature of Science Knowledge and Scientific Argumentation Skills in Taiwanese College Biology Students
MeiChun Lai, The Ohio State University, lai.146@osu.edu
Karen E. Irving, The Ohio State University
Enhancing Pre-service Science Teachers’ Perceived Self-efficacy about Argumentation through Modeling and Mastery Experiences
Feral Ogan-Bekiroglu, Marmara University, feralogan@yahoo.com
Mehmet Aydeniz, The University of Tennessee

Students’ Goals and Expectations in a Physics Course for Education Majors
Jon D. H. Gaffney, University of Kentucky, jon.gaffney@uky.edu

Strand 6: Science Learning in Informal Contexts
Strand Sponsored Session-Current Trends and Directions in Research about Learning and Teaching in Informal Contexts
2:45pm – 4:00pm, Room 305
Discussant:
Sandra T. Martell, National Science Foundation, smartell@uwm.edu

Presenters:
Jennifer DeWitt, King’s College London
Preeti Gupta, New York Hall of Science
David E. Kanter, New York Hall of Science
Leonie J. Rennie, Curtin University, Western Australia
Monya Ruffin, National Science Foundation

Strand 7: Pre-service Science Teacher Education
Pre-Service Teachers’ Physics Content Knowledge
2:45pm – 4:00pm, Room 306
Presider:
Vanessa Kind, Durham University

Effects of Calculator Based Laboratory Usage on Pre-Service Physics Teachers’ Teaching Practices
Fatma Caner, Marmara University, canerfatma@gmail.com
Feral Ogan-Bekiroglu, Marmara University
Hanife Hakyolu

Physics Teacher Candidates’ Views about Science and Scientific Knowledge after High School Physics Curricula Revisions
Kübra Eryurt, keryurt@metu.edu.tr
Özlem Oktay

Strand 8: In-service Science Teacher Education
Related Paper Set - Virginia Initiative for Science Teaching and Achievement (VISTA) - First Year Statewide Implementation
2:45pm – 4:00pm, Room 105
Presider:
Donna R. Sterling, George Mason University

Refining Inquiry Based Science Instruction Through Professional Development Using the VISTA Model
Anne Mannarino, College of William and Mary, amannarino@wm.edu
Mollianne G. Logerwell, George Mason University
Victoria Reid, College of William and Mary
Elizabeth Edmondson, Virginia Commonwealth University

Constructing the Science Methods Course as a Shared Instructional Product
Juanita Jo Matkins, College of William and Mary, jjmatkins@wm.edu
Donna R. Sterling, George Mason University
Jacqueline Theresa Mcdonnough, Virginia Commonwealth University
Wendy M. Frazier, George Mason University

Investigating the Impact of a New Science Coordinator/Liaison Academy
Elizabeth Edmondson, Virginia Commonwealth University, ewedmondson@vcu.edu
Eric M. Rhodes, George Mason University
Karla Ver Bryck Block, George Mason University
Donna R. Sterling, George Mason University
Victoria Reid, College of William and Mary

Virginia Science Education at the Crossroads: Connecting Science Education Faculty to a Professional Community
Jacqueline Theresa Mcdonnough, Virginia Commonwealth University, jtmcdonnough@vcu.edu
Donna R. Sterling, George Mason University
Juanita Jo Matkins, College of William and Mary
Wendy M. Frazier, George Mason University
Outcomes of the Virginia Initiative for Science Teaching and Achievement (VISTA) Professional Development
Jennifer Maeng, University of Virginia, jlc7d@virginia.edu
Randy L. Bell, University of Virginia

Strand 8: In-service Science Teacher Education
Changing the Practice of Science Teachers
2:45pm – 4:00pm, Room 106
Presider:
Sheryl L. McGlamery, University of Nebraska

The Development of Domain-specific Expertise when Experienced Chemistry Teachers Participate in a Community of Practice
Ria Dolfing, Utrecht University, Utrecht, r.dolfing@uu.nl
Onno De Jong, Utrecht University, Utrecht
Astrid M. W. Bulte, Utrecht University, Utrecht
Alberit Pilot, Utrecht University, Utrecht
Jan D. Vermunt, Utrecht University, Utrecht

Relationship, Time and Instructional Focus: Maximizing the Effects of Science Coaching
Ruth A. Anderson, FACET Innovations, LLC, randerson@facetinnovations.com
Jim Minstrell, FACET Innovations
Sue Feldman, Education Service District 112, Washington State

The Effect of the GK-12 Program on Teachers: Evaluating Reciprocal Coaching as a Differentiated Professional Development Strategy for Experienced Teachers
Kirstin C. Busch, University of Texas at Austin, kirstinbusch@utexas.edu

Talking about Student Learning: Science and Mathematics Teachers’ Collaborative Inquiry Processes
Tamara H. Nelson, Washington State University Vancouver, tnelson1@vancouver.wsu.edu
David Slavit, Washington State University Vancouver
Angie Deuel, Washington State University Vancouver

Strand 10: Curriculum, Evaluation, and Assessment
Studies in Engineering and Design Education
2:45pm – 4:00pm, Room 308
Presider:
Kristin L. Koskey, The University of Akron

The Impact of Engineering Curriculum Units on Students’ Attitudes towards Engineering and Science
Cathy P Lachapelle, Museum of Science, Boston, clachapelle@mos.org
Preeya Phadnis, Museum of Science, Boston
Jennifer Joez, Museum of Science, Boston
Christine M. Cunningham, Museum of Science, Boston

Investigating the Impact of a Lego-based, Engineering-oriented Curriculum Compared to an Inquiry-based Curriculum on Fifth Graders’ Content Learning of Simple Machines
Ismail Marulcu, Erciyes University, imarulcu@erciyes.edu.tr
Mike Barnet, Boston College

Using and Comparing Paper and Media to Improve Student Reflection in Science and Design Courses
Tamecia R. Jones, Purdue University, tameciajones@purdue.edu
Monica E. Cardella, Purdue University
Senay Purzer, Purdue University

Strand 11: Cultural, Social, and Gender Issues
Language and Culture of Science: National and International Contexts
2:45pm – 4:00pm, Room 107
Presider:
Rowhea M. Elmesky, Washington University in St. Louis

Place-legitimized Kenyan Scientific Knowledge and Its Relevance to Science Education
Nicole Beeman-Cadwallader, Indiana University, nbeeman@umail.iu.edu
Gayle A. Buck, Indiana University

Exploring NOS with Immigrant Somali Youth in a Charter School Biology Curriculum
Nancy Albrecht, University of Minnesota, albr0137@umn.edu
Allison Kirchoff, Independent Consultant
Gillian Roehrig, University of Minnesota
Bhaskar Upadhyay, University of Minnesota

Mother Tongue Policy and Science Teaching in Nigeria: A Conflict Between Policy Provision and Reality
Peter A. Okebukola, Lagos State University, Lagos, Nigeria, pokebukola@yahoo.com
Tunde Owolabi, Lagos State University, Lagos, Nigeria
Foluso O. Okebukola, Lagos State University, Lagos, Nigeria
Strand 12: Educational Technology
Biotechnology, Genetics & DNA Sequencing through Technology
2:45pm – 4:00pm, Room 101

President:
Eva Erdosne Toth, West Virginia University

Exploring the Impact of Animation-based Genetic Instruction on Students’ Perceived Cognitive Load and Learning Outcomes
Chyi Yang, New Taipei City Tucheng Junior High School, chyi51757@gmail.com
Ting-Kuang Yeh, Science Education Center
Wen-Ta Yang, China Medical University
Chun-Yeh Chang, Science Education Center

Helping Students Conduct Complex Research by Using a Scaffolding Software Tool
Andrew K. Vershon, Rutgers University, vershon@waksman.rutgers.edu
Susan E. Coletta, Rutgers University
Jeffrey D. Charney, Evaluator
Douglas Lownsbery, WestEd
Barbara C. Buckley, WestEd

Strand 13: History, Philosophy, and Sociology of Science
Socioscientific Issues & Argumentation
2:45pm – 4:00pm, Room 102

President:
Sibel Erduran, University of Bristol

The Transfer of Nature of Science Understandings into Unfamiliar Contexts
Rola Khishfe, rk19@aub.edu.lb

Cross-Cultural Comparisons of Epistemological Beliefs on Socioscientific Issues
Dana L. Zeidler, University of South Florida, zeidler@usf.edu
Benjamin C. Herman, University of South Florida
Mitch Razek, University of South Florida

‘Visualizing’ Evidence and Scientific Methods, and Implications for Science Education
Sibel Erduran, University of Bristol, sibel.erduran@bristol.ac.uk
Maria Evagorou, University of Nicosia

Strand 14: Environmental Education
Enhancing the Development of Ecological Literacy in K-16 Education
2:45pm – 4:00pm, Room 103

President:
Bruce Johnson, University of Arizona

Writing-to-Learn Activities as a Measure of Ecological Literacy in College Students
Alison M. Wallace, Minnesota State University Moorhead, wallacea@mnstate.edu
Meena M. Balgopal, Colorado State University

Developing a Questionnaire as a Research Tool to Characterize Students’ Perception of Renewable Energy
Tami Fishel, Ben Gurion University of the Negev, Israel, tamiBritt@bgu.ac.il
Orit Ben-Zvi Assaraf, Ben Gurion University of the Negev, Israel
Hanan Ginat, Dead Sea and Arava Science Center

Sustainability through the Lens of Earth Education: Children’s Ecological Understandings and Environmental Attitudes
Constantinos C. Manoli, University of Cyprus, manoli@ucy.ac.cy
Bruce Johnson, University of Arizona
Andreas Ch Hadjichambis, Cyprus Centre for Environmental Research and Education
Demetra Hadjichambis, University of Cyprus
Yiannis Georgiou, Cyprus Centre for Environmental Research and Education
Hara Ioannou, Cyprus Centre for Environmental Research and Education

Lessons from the Tree: How the Tree that Owns Itself Taught its Town
Debra B. Mitchell, University of Georgia, dbmitchl@uga.edu
Rachel Luther, University of Georgia
Michael Mueller, University of Georgia
Break
4:00pm – 4:30pm, Foyer – White River Ballroom

Plenary Session #1
Towards an Empirically-Grounded Theory of Action for Improving the Quality of Teaching Subject Matter at Scale
4:30pm – 6:00pm, White River Ballroom A – E
Presider:
J. Randy McGinnis, NARST President, University of Maryland
Keynote Presenters:
Paul Cobb, Vanderbilt University
Kara Jackson, McGill University

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, Room 101
Presiders:
Corinne Lardy, San Diego State University, corinne_lardy@yahoo.com
Mike U. Smith, Mercer University

Research Interest Group (RIG) Meeting
The Continental and Diasporic Africa in Science Education
The goal of this meeting is to (a) encourage science educators to engage in research aimed at meeting the needs of people of African descent and (b) provide intellectual, professional, and personal space for science educators engaged in such research.
6:00pm – 7:00pm, Room 103
Presiders:
Mary M. Atwater, The University of Georgia
Felicia M. Mensah, Teachers College, Columbia University

Presidential/Welcome Reception
Social Event: All NARST members are welcome—free appetizers and cash bar.
7:00pm – 9:30pm, White River Ballroom F – J
6:00am - 10:00am

The INDY 5000 (5K) Science Education Fun Run / Walk
6:00am – 7:15am, JW Marriott Lobby

Conference Registration
7:00am – 5:00pm, White River Registration

Committee Meetings
7:30am – 8:15am

Awards Committee Chairs & Co-Chairs Meeting
7:30am – 8:15am, Room 301

Equity and Ethics Committee Meeting
7:30am – 8:15am, Room 302

External Policy and Relations Committee Meeting
7:30am – 8:15am, Room 303

Research Committee Meeting
7:30am – 8:15am, Room 304

Membership and Election Committee Meeting
7:30am – 8:15am, Room 305

International Committee Meeting
7:30am – 8:15am, Room 306

Program Committee Meeting
7:30am – 8:15am, Room 308

Publications Advisory Committee Meeting
7:30am – 8:15am, Room 309

8:30am – 10:00am

Concurrent Session #3
External Policy Committee & Strand 15: Policy Sponsored Session
Symposium - Session 1: Next Generation Science Standards: Tracking the Federal Research Agenda
8:30am – 10:00am, Room 104

Presiders:
Andrew Shouse, University of Washington
Christopher Wilson, BSCS

Presenters:
Martin Storksdieck, NRC Board of Science Education
Philip L. Bell, University of Washington
Elizabeth A. Davis, University of Michigan
Deborah C. Smith, Pennsylvania State University

Publications Advisory Committee Sponsored Session
Symposium - Discussion with the Editors of Various Science Education Journals
8:30am – 10:00am, Room 103

Presiders:
Carolyn S. Wallace, Indiana State University
Jan H. Van Driel, ICLON Leiden University, The Netherlands

Strand 1: Science Learning, Understanding and Conceptual Change
Related Paper Set - Using Learning Progressions Research to Teach for Environmental Science Literacy
8:30am – 10:00am, Room 310

Analyzing Students Learning Performances in Terms of Practices for Developing Accounts
Hui Jin, Ohio State University, hjin@ehe.osu.edu
Li Zhan, Michigan State University
Dante Cisterna, Michigan State University
Charles W. Anderson, Michigan State University

Students’ Learning Performance and its Relation to Teaching Practice
Li Zhan, Michigan State University, zhanli@msu.edu
Dante Cisterna, Michigan State University
Charles W. Anderson, Michigan State University
Developing and Validating Scoring Procedures for Students’ Written Accounts of Carbon-transforming Processes
Jennifer H. Doherty, Michigan State University, dohertyjh@gmail.com
Karen Draney, University of California, Berkeley

Analyzing College Students’ Learning about Carbon-transforming Processes
Jonathon Schramm, Michigan State University, schram25@msu.edu
Jennifer H. Doherty, Michigan State University
Charles W. Anderson, Michigan State University

Using a Water Systems Learning Progression to Design and Test Formative Assessments and Tools for Reasoning
Beth A. Covitt, University of Montana, beth.covitt@umontana.edu
Kristin L. Gunckel, University of Arizona

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Related Paper Set - Models and Modeling as a Foundation for Science Education
8:30am – 10:00am, Room 302

Introducing the Models Pyramid: Building Foundation, Structure, and Substance for Science Education
Cynthia Passmore, University of California, Davis, cpassmore@ucdavis.edu
Julia Svoboda, University of California, Davis

Authentic Scientific Practices Emerge from a Model-centered Physics Course
Wendell Potter, University of California, Davis, whpotter@ucdavis.edu
Cassandra Paul, University of California, Davis
Julia Svoboda, University of California, Davis

Teachers Use of Models to Give Coherence and Meaning to Scientific Content
Rich Hedman, Sacramento State University, hedmanel@csus.edu
Connie Hvidsten, Biological Science Curriculum Study
Arthur Beauchamp, University of California, Davis
Cynthia Passmore, University of California, Davis

Modeling and the Substance of a Sophisticated Epistemology of Science
Julia Svoboda, University of California, Davis, jmsvoboda@ucdavis.edu
Cynthia Passmore, University of California, Davis

Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies
The Language of Science
8:30am – 10:00am, Room 301

Development of the Blended / Tiered Approach to Scaffolding Academic Vocabulary within Inquiry Science Instruction for English Language Learners
David T. Crowther, University of Nevada, Reno, crowther@unr.edu

Science Language and Conceptual Understanding in Second Grade: Promoting Gains Across Levels of English Proficiency
Sheryl L. Honig, Northern Illinois University, shonig@niu.edu

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

Symposium - Global Warming Climate Change: Perspectives on Student Learning and Adaptation of Instructional Materials
8:30am – 10:00am, Room 313

Presider:
J. Randy McGinnis, NARST President, University of Maryland

Presenters:
Anita Roychoudhury, Purdue University, aroychou@purdue.edu
Daniel Shepardson, Purdue University
Bruce Patton, The Ohio State University
Melissa George, Tecumseh Junior High School
Susie Burton, Tecumseh Junior High School
Joel Wilson, Frankfort Middle School
Nicole Goodwine, Benton Middle School

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies
The Pedagogy of Argumentation
8:30am – 10:00am, Room 303

Presider:
Vanessa Kind, Durham University

Mapping Model to Argument-based Inquiry as an Approach to Support Middle School Teachers in Teaching Climate, Weather, and Energy Topics
Morgan B. Yarker, University of Iowa, morgan-e-brown@uiowa.edu
Charles O. Stanier, University of Iowa
Cory T. Forbes, University of Iowa
Soonhye Park, University of Iowa
Using Laboratory Activities that Emphasize Argumentation and Argument to Help High School Students Learn how to Engage in Scientific Inquiry and Understand the Nature of Scientific Inquiry
Victor D. Sampson, Florida State University, vsampson@fsu.edu
Jonathon Grooms, Florida State University
Patrick J. Enderle, Florida State University
Sherry A. Southland, Florida State University

Effective Teaching Strategies to Promote Argumentation Skills about Socioscientific Issues
Vaille Dawson, Curtin University of Technology, vdawson@curtin.edu.au
Grady J. Venville, University of Western Australia

Constructing and Negotiating Claims and Evidence in Scientific Inquiry Investigations
Aeran Choi, Kent State University, aeran-choi@hotmail.com
Jeonghee Nam, Pusan National University

Strand 5: College Science Teaching and Learning (Grades 13-20)
Science and Mathematics Integration
8:30am – 10:00am, Room 304
Presider: Penny J. Gilmer, Florida State University

A Faculty Learning Community for Integrating Quantitative Statistical Analysis into Undergraduate Biology: Preliminary Impacts and Lessons Learned
Loran Carleton Parker, Purdue University, carleton@purdue.edu
Annwesa Dasgupta, Purdue University
Omolola A. Adedokun, Purdue University
James Forney, Purdue University
Dennis J. Minchella, Purdue University

College Students’ Views of the use of Mathematics in Physics: A Case Study of Two Cohorts
N. Sanjay Rebello, Kansas State University, srebello@phys.ksu.edu
Carina M. Rebello, University of Missouri

Secondary Preparation for College Calculus: A Phenomenography of Mathematics Professors’ and Mathematics Teachers’ Perspectives
Carol H. Wade, Harvard University, cwade@cfa.harvard.edu
Zahra Hazari, Clemson University
Gerhard Sonnert, Harvard University
Phil Sadler, Harvard University

Strand 6: Science Learning in Informal Contexts
Professional Development for Educators: Identity Development and Learning in Informal Institutions
8:30am – 10:00am, Room 305
Presider: Anita Welch, North Dakota State University

The Long Term Impact of Working as a Floor Facilitator in a Science Center
Preeti Gupta, New York Hall of Science, pgupta@nysci.org

Characterizing Farmworker Pesticide Educators in a Southeastern State: An Examination of Informal Science Educators’ Beliefs about Teaching, Pesticides, and Self
Catherine E. LePrevost, North Carolina State University, cjeleprev@ncsu.edu
Margaret R. Blanchard, North Carolina State University
Gregory Cope, North Carolina State University
Experience, Capacity and Identity: Understanding Teachers at the Boundary between Schools and Informal Science Institutions
James F. Kisiel, California State University, Long Beach, jkisiel@csulb.edu

“Wow! Look at That!”: The Impact of Professional Development in Informal Science Contexts on Teachers’ Discourse
Gary M. Holliday, University of Akron, gholliday@mac.com
Norman G. Lederman, Illinois Institute of Technology
Judith S. Lederman, Illinois Institute of Technology

Strand 7: Pre-service Science Teacher Education
Chemistry Teacher Preparation
8:30am – 10:00am, Room 306
Presider:
Lloyd H. Barrow, University of Missouri

Developing Topic Specific PCK in Pre-service Chemistry Teachers
Elizabeth M. Mavhunga, Wits University, Elizabeth.Mavhunga@wits.ac.za
Marissa S. Rollnick, Wits University

Differences in the Degree of Scientific Realism of Secondary Pre-service Chemistry and Physics Teachers
Norman F. Riehs, University of Duisburg-Essen, norman.riehs@uni-due.de
Stefan Rumann, University of Duisburg-Essen

Development of Pre-service Chemistry Teachers’ Pedagogical Content Knowledge for Teaching Nature of Science
Betul Demirdogen, Middle East Technical University, dbetul@metu.edu.tr
Deborah L. Hanuscin, University of Missouri
Esen Uzuntiryaki, Middle East Technical University
Fittan Koseoglu, Gazi University

Strand 8: In-service Science Teacher Education
8:30am – 10:00am, Room 105
Presider:
Nicole Gillespie, Knowles Science Teaching Foundation

Recruitment and Selection of High Quality Teacher Candidates
Jodie Galosy, Knowles Science Teaching Foundation, jgalosy@kstf.org
Howard Glasser, Knowles Science Teaching Foundation
Erin Rizor, Knowles Science Teaching Foundation
Nicole Gillespie, Knowles Science Teaching Foundation
Mark St. John, Inverness Research

Progress and Challenges in Developing a Professional Learning Community to Support Teacher Learning and Retention
Zora Wolfe, Knowles Science Teaching Foundation, zwolfe@kstf.org
Paul Wendel, Knowles Science Teaching Foundation
Jodie Galosy, Knowles Science Teaching Foundation

Key Practices for Supporting the Development of Pedagogical Content Knowledge
Roseanne Rostock, Knowles Science Teaching Foundation, rrostock@kstf.org
Michele Cheyne, Knowles Science Teaching Foundation
Jodie Galosy, Knowles Science Teaching Foundation
Nicole Gillespie, Knowles Science Teaching Foundation

Developing a Continuum for Teacher Leadership
Carol Rulli, Knowles Science Teaching Foundation, crulli@kstf.org
Jodie Galosy, Knowles Science Teaching Foundation
Erin Rizor, Knowles Science Teaching Foundation

Science by Doing: Enhancing Teachers’ Skills in Inquiry-Based Teaching through a Resource-Supported Professional Learning Approach
Leonie J. Rennie, Curtin University, l.rennie@curtin.edu.au
Denis Goodrum, Australian Academy of Science
Amelia Druhan, Australian Academy of Science

Tracking Teachers’ Change in Teaching Science as Inquiry: Different Teachers, Different Journeys
Daniel K. Capps, University of Maine, danielkcapps@gmail.com
Barbara A. Crawford, University of Georgia

Middle and High School Science Teachers’ Inquiry Lesson Development and Implementation
Sue Ellen DeChenne, University of Nebraska - Lincoln, sdechenne2@unlserve.unl.edu
Gina Kunz, University of Nebraska - Lincoln
Gwen Nugent, University of Nebraska - Lincoln
Linlin Luo, University of Nebraska - Lincoln
Brandi Berry, University of Nebraska - Lincoln
Katherine Craven, University of Nebraska - Lincoln
April Riggs, University of Nebraska - Lincoln

A Teacher Professional Development Model Focused on Authentic Science Practices in the Classroom
Barbara A. Crawford, University of Georgia, barbarac@uga.edu
Daniel K. Capps, The University of Maine
Maya Patel, Ithaca College
Xenia S. Meyer, University of California, Berkeley
Robert Ross, The Paleontological Research Institution
8:30am - 10:00am

Strand 10: Curriculum, Evaluation, and Assessment
Strand Sponsored Symposium - New Generation of Science Curriculum and Assessment: International Perspectives
8:30am – 10:00am, Room 308

Presider:
Ling L. Liang, LaSalle University, USA

Presenters:
Gavin W. Fulmer, National Science Foundation, USA
Michael J. Reiss, Institute of Education, University of London, UK
Lingbiao Gao, South China Normal University, China
Larry D. Yore, University of Victoria, Canada
Joseph S. Krajcik, Michigan State University, USA

Strand 11: Cultural, Social, and Gender Issues
Cultural and Linguistic Diversity: Implications for Career Choices and Classroom Learning
8:30am – 10:00am, Room 107

Presider:
Christina Siry, University of Luxembourg

A Case Study Exploring Latina Girls’ Perceptions of Pursuing a Career in Biology
Yeni Violeta Garcia, University of Northern Colorado, yenigarcia@unco.edu

Immigrant Generation as Predictor for Pursuing Careers in Life Sciences, Physical Sciences and Engineering
Florin D. Lung, Clemson University, florinlung@gmail.com
Geoff Porvin, Clemson University
Gerhard Sonnert, Harvard-Smithsonian Center for Astrophysics
Philip M. Sadler, Harvard-Smithsonian Center for Astrophysics

Microcosmos: A Culturally Relevant Science-Learning Environment for 2nd Generation Latino Elementary Students
Ingrid M. Sanchez Tapia, University of Michigan, ingridsa@umich.edu
Consuelo J. Morales, University of Michigan, Ann Arbor
Teresa Satterfield

How One Teacher Promoted Science Discourse among English Learners: Describing Pedagogical Successes and Continued Challenges
Lauren H. Swanson, Whittier College Whittier, California, lswanson@whittier.edu

Strand 12: Educational Technology
Cognitive Reasoning with Technology
8:30am – 10:00am, Room 101

Presider:
Barbara C. Buckley, WestEd

Levels of Reasoning among Girls Engaged in Technology-Enhanced Science Inquiry in an Urban Elementary Classroom
Amy Trauth-Nare, Indiana University, amtrauth@indiana.edu
Gayle A. Buck, Indiana University
Nicole Beeman-Cachvallader, Indiana University

Being Smart About SmartGraphs: An Experimental Trial in Physical Science Classrooms
Rachel E. Kay, The Concord Consortium, RKay@concord.org
Andrew Zucker, The Concord Consortium
Carolyn Staudt, The Concord Consortium

Avatar Attributes and a Third Space: Supporting Positive Affect in Learning Science through Virtual Digital Assistants
Eric N. Wiebe, North Carolina State University, eric_wiebe@ncsu.edu
Jennifer London, North Carolina State University
Gail M. Jones, North Carolina State University
John Bedward, North Carolina State University

Strand 13: History, Philosophy, and Sociology of Science
Chemistry Education
8:30am – 10:00am, Room 102

Why Has the Bohr-Sommerfeld Model of the Atom been Ignored by General Chemistry Textbooks?
Liberato Cardellini, Universita Politecnica delle Marche, Italy, l.cardellini@univpm.it
Mansoor Niaz, Universidad de Oriente, Venezuela

Midgley, Tetaethyl Lead and CFCs: A Historical Case Study for Chemical Education
Paulo A. Porto, Instituto de Quimica - Universidade de Sao Paulo (Brasil), palporto@iq.usp.br
Helio E. B. Viana, Universidade Federal da Bahia (Brasil)

How Chemistry Works? Reflections on Triadic Approaches and a Contribution From Peircean Semiotics
Karina A.ED Souza, Instituto Federal de Sao Paulo, karina_souza@isfs.edu.br
Paulo A. Porto, Instituto de Quimica - Universidade de Sao Paulo
The Role of 5E Learning Cycle Model on Students’ Conceptual Understanding of Solubility Equilibrium Concepts
Nurdane Aydemir, nurdaneyazici@gmail.com
Omer Geban
Murat Aydemir

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

Equity and Ethics Committee Sponsored Session
Re-Imagining Our Research by Using New Theoretical Frameworks in Science Education
10:15am – 11:45am, Room 313
Presiders:
Felicia M. Mensah, Teachers College, Columbia University
Julie A. Bianchini, University of California, Santa Barbara

Presenters:
Heidi Carlone, University of North Carolina-Greensboro
Pauline Chinn, University of Hawaii-Manoa
Alberto J. Rodriguez, San Diego State University
Randy Yerrick, University of New York-Buffalo
Eileen C. Parsons, University of North Carolina-Chapel Hill

External Policy Committee & Strand 15: Policy Sponsored Session
Session 2: Opting In: State Education Agencies and the Next Generation Science Standards
10:15am – 11:45am, Room 104
Presiders:
Andrew W. Shouse, University of Washington
Christopher Wilson, BSCS

Presenters:
Tom Keller, National Research Council
Stephen Pruitt, Achieve
Peter McLaren, Rhode Island Department of Education

Strand 1: Science Learning, Understanding and Conceptual Change
Biology Instruction and Assessment
10:15am – 11:45am, Room 310
Presider: Anat Yarden, Weizmann Institute of Science

Reliability and Validity of Scores on the Transformative Experience Questionnaire on Matter and Genetics
Kristin L. Koskey, The University of Akron, koskey@uakron.edu
Tony A. Sondergeld, Bowling Green State University
Victoria C. Stewart, The University of Toledo
Kathryn Vuchak, The University of Akron
Kevin J. Pugh, University of Northern Colorado

Eighth Grade Students’ Conceptions of Energy Flow through Ecosystems
Ashlie M. Beals, University of Kentucky, ambeal0@uky.edu
Rebecca M. Krall, University of Kentucky

Students’ Systemic Reasoning of Food Webs at Lower Elementary Level (Grades 1-4)
Hayat Hokayem, Michigan State University, alhokaye@msu.edu
Amelia Wenk Gotwals, Michigan State University

Feeling of Certainty: Uncovering a Missing Link between Knowledge and Acceptance of Evolution
David L. Hauy, The Ohio State University, hauy.2@osu.edu
Minsu Ha, The Ohio State University
Ross H. Nehm, The Ohio State University

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Argumentation and Discussion
10:15am – 11:45am, Room 302
Presider: David L. Fortus, Weizmann Institute of Science

The Influence of Students’ Acceptance of Evolution on SSI Negotiation
Samantha R. Fowler, Clayton State University, samantha.fowler@clayton.edu
Dana L. Zeidler, University of South Florida

Beyond “Doing the Lesson”: The Nature of Argumentation in a Fifth-Grade Classroom
Ying-Chih Chen, University of Minnesota, chen2719@umn.edu
Brian M. Hand, University of Iowa
Soonbye Park, University of Iowa

Comparing Students’ Written and Verbal Scientific Arguments
Amanda M. Knight, Boston College, knightam@bc.edu
Katherine L. McNeill, Boston College

For whom is Argument and Explanation a Necessary Distinction?
Leema Berland, University of Texas, Austin, leema.berland@mail.utexas.edu
Katherine L. McNeill, Boston College
Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies
Language and Literacy in the Elementary Classroom
10:15am – 11:45am, Room 301
Presider: Sarah J. Carrier, North Carolina State University

Lexical Complexity of Science Read-aloud Texts and Discussion
Rory J. Glass, University of Albany, rcbglass@aol.com

Using Pictorial Models in Elementary Science Read-Alouds to Communicate Science across Grade Levels
Michael Mastroianni, University at Albany, SUNY, mastroianni@gmail.com
Seema Rivera, SUNY Albany
Rory J. Glass, University of Albany
Alandeom W. Oliveira, University at Albany
Francine Wizner, University at Albany, SUNY

Reading Pictorial Models in Elementary Read-Alouds
Seema Rivera, University at Albany, SUNY, SR681696@albany.edu
Michael Mastroianni, University at Albany, SUNY
Alandeom W. Oliveira, University at Albany, SUNY
Rory J. Glass, University at Albany
Vincent Amodeo, University at Albany, SUNY
Francine Wizner, University at Albany, SUNY

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies
Related Paper Set - Multiple Approaches to Video as a Tool for Exploring Teachers’ Pedagogical Content Knowledge
10:15am – 11:45am, Room 303
Presider: Alicia C. Alonzo, Michigan State University
Discussant: Julie A. Luft, The University of Georgia

Exploring Teachers’ Pedagogical Content Knowledge in Formative Assessment Conversations
Krystin Mayer, Michigan State University, kristimayer@gmail.com
Alicia C. Alonzo, Michigan State University

Exploring Teachers’ Pedagogical Content Knowledge through Enactments of a Newton’s Third Law Demonstration
Sarah Guile, Michigan State University, guilesar@msu.edu
Alicia C. Alonzo, Michigan State University

Exploring Teachers’ Pedagogical Content Knowledge Elicited with Video Clips from Their Own Classroom Instruction
Jiwon Kim, Michigan State University, kajnjws1@msu.edu
Alicia C. Alonzo, Michigan State University

Exploring Teachers’ Pedagogical Content Knowledge Elicited with Video Clips Focused on Student Thinking
Alicia C. Alonzo, Michigan State University
Jiwon Kim, Michigan State University

Strand 5: College Science Teaching and Learning (Grades 13-20)
Conceptual Understanding - Biology
10:15am – 11:45am, Room 304
Presider: Peter A. Okebukola, Lagos State University

Exploring Teachers’ Pedagogical Content Knowledge Elicited with Video Clips from Their Own Classroom Instruction
Jiwon Kim, Michigan State University, kajnjws1@msu.edu
Alicia C. Alonzo, Michigan State University

Investigating the Relationship between College Students’ Acceptance of Evolution and Tree Thinking Understanding
Kristy L. Halverson, University of Southern Mississippi, kristy.halverson@usm.edu
Emily Walter, University of Missouri
Carrie J. Boyce, University of Southern Mississippi

Undergraduate Biology Students’ Conceptions of the Term ‘Animal’
Andrea Biema, Western Michigan University, andrea.m.kryger@wmich.edu
Renee S. Schwartz, Western Michigan University

Microbiology Instruction: Students’ Perceptions of Risks Related to Microbial Illness
Gail M. Jones, NC State University, Gail_Jones@ncsu.edu
Grant E. Gardner, East Carolina University
Tammy M. Lee, East Carolina University
Sarah Robert, NC State University
Kayla Poland, NC State University

College Freshmen Students’ Conceptions of Natural Selection and Evolution
Mustafa B. Aktan, Hacettepe University, mbaktan@hacettepe.edu.tr
Strand 5: College Science Teaching and Learning (Grades 13-20)

Learning through Experiences
10:15am – 11:45am, Room 309

Presider:
Geoff Potvin, Clemson University

Undergraduate Science Course Reform: Impacts on Faculty and Students
Dennis W. Sural, The University of Alabama, dwsural@bama.ua.edu
Cynthia Sural, The University of Alabama
Mason Cheryl, San Diego State University
Dean A. Zollman, Kansas State University

Learning through Undergraduate Research: Practice of Inquiry and Understandings about Nature of Science and Nature of Scientific Inquiry
Maya Patel, Ithaca College, Cornell University, mpatel@ithaca.edu
Barbara A. Crawford, University of Georgia
Deborah Trumbull, Cornell University

Teaching Teamwork & Communication: Faculty Beliefs in Engineering Education
Andrea M. Motto, Virginia Tech, andreamotto@vt.edu
Holly Matasovich, Virginia Tech
Marie Paretti, Virginia Tech

Metacognition and Learning Gain in Foundation Chemistry: A Case Study
Marietjie Potgieter, University of Pretoria, marietjie.potgieter@up.ac.za
Kgadi Mathabathe, Department of Science, Mathematics and Technology Education, University of Pretoria
Salome Human-Vogel, Department of Educational Psychology, University of Pretoria

Strand 6: Science Learning in Informal Contexts

Related Paper Set - Designing for Science Learning: Accounting for the Role for Families and Parents in Supporting Youth
10:15am – 11:45am, Room 305

Presider:
Heather Toomey Zimmerman, Pennsylvania State University

Discussant:
Lynn D. Dierking, Oregon State University

Understanding How Families use Observational Tools during Nature Center Hikes
Heather Toomey Zimmerman, Pennsylvania State University, heather@psu.edu
Lucy R. McClain, Penn State University
Michele Crowl, Pennsylvania State University
Lynn D. Dierking, Oregon State University

Connecting School Science Learning with At-home Activities: Documenting Learning through a Science Backpack Program
Carrie T. Tzou, University of Washington, tzouct@northwestern.edu
Elyse Litvack, Maple Elementary

Tools for Talk: Strategies for Supporting the Observational Capacity of Families
Catherine Eberbach, Rutgers University, catherine.eberbach@gse.rutgers.edu

Disciplinary Talk by Design: Identifying Expert and Novice Patterns of Parent-child Engagement with Exhibits
Sasha Palmquist, Institute for Learning Innovation, spalmquist@gmail.com

Exploring the Impact of Family Involvement on Youth Engagement in a Creative Robotics Workshop
Debra Bernstein, TERC, debra_bernstein@terc.edu
Emily Hamner, Carnegie Mellon University

Strand 7: Pre-service Science Teacher Education

Elementary Science Teacher Preparation I
10:15am – 11:45am, Room 306

Presider:
Gail L. Dickinson, Texas State University

Preservice Elementary Teachers in Service Learning Settings: Developing Ideas about Teaching, Learning and Teacher Identity
Carolyn S. Wallace, Indiana State University, carolyn.wallace@indstate.edu
Charles Eick, Auburn University

Encouraging Elementary Teacher Candidates’ Understandings of Ambitious Science Instruction
Julianne A. Wenner, The University of Georgia, jakent@uga.edu
Julie M. Kittleson, The University of Georgia
Janna Dresden, The University of Georgia

Learning to Support Elementary Students’ Scientific Reasoning: Preservice Elementary Teachers and the Evidence-Explanation Continuum
Laura Zangori, University of Iowa, laura-zangori@uiowa.edu
Mandy Biggers, University of Iowa

Pre-service Elementary Teachers’ Learning to Integrate Science and Language Instruction for Linguistically Diverse Students
Youngjin Song, University of Northern Colorado, youngjin.song@unco.edu
Elizabeth Franklin, University of Northern Colorado
Teresa Higgins, University of Northern Colorado
Strand 8: In-service Science Teacher Education
Development and Characteristics of Science Teacher Leaders
10:15am – 11:45am, Room 105

Presider:
Jodie Galosy, Knowles Science Teaching Foundation

The Relationship between Effectual Reasoning and Implementing Innovations among K-12 Science Teachers
Anita M. Martin, University of Illinois, abmartin@illinois.edu
Foxad Abd-El-Khalick, University of Illinois
Ray Price, University of Illinois
Elisa Mustari, University of Illinois

Science, Technology, Engineering, Mathematics, and World Language Teachers: Fostering Teacher Leaders for the 21st Century
Wendy M. Frazier, George Mason University, Fairfax, Virginia, wfrazier@gmu.edu
Rebecca K. Fox, George Mason University, Fairfax, Virginia
Mollianne G. Logerwell, George Mason University, Fairfax, Virginia

Exploring Ninth-Grade Science Teachers’ Path of Leadership for Implementing Educational Reform Efforts: A Case Study
Carina M. Rebello, University of Missouri, cp5xc@mail.mizzou.edu
Ya-Wen Cheng, University of Missouri
Somnath Sinha, University of Missouri
Deborah L. Hanuscin, University of Missouri-Columbia

Developing Science Teacher Leaders through Long-Term Professional Development: A Cross-Case Analysis of Four Teachers
Janelle M. Bailey, University of Nevada, Las Vegas, Janelle.Bailey@unlv.edu
Abeera Rehmat, University of Nevada, Las Vegas
Doug Lombardi, University of Nevada, Las Vegas
Edward Keppelmann, University of Nevada, Reno

Strand 8: Research Experiences for Science Teachers
Development and Implementation
10:15am – 11:45am, Room 106

Presider:
Donna R. Sterling, George Mason University

The Impact of RET’s on Elementary and Secondary Grade Level of Teachers’ Views of Scientific Inquiry
Sibel Uysal Bahbah, suysal@fsu.edu
Barry Golden
Beth Kostka
Semra Mirici
Giang Nguyen

Assessing the Value of Research Experiences for Teachers: Building Knowledge, Skills, Credibility, and Identity
Sanlyn R. Buxner, University of Arizona, buxner@email.arizona.edu

Challenges and Benefits of Implementing Authentic Inquiry-Based Instruction through a Research Experience for Teachers Program
Lisa C. Benson, Dept of Engineering and Science Education, Clemson University, lbenson@clemson.edu
Carol H. Wade, Harvard/Smithsonian Center for Astrophysics

Strand 10: Curriculum, Evaluation, and Assessment
Curriculum and Implementation
10:15am – 11:45am, Room 308

Presider:
Mary M. Atwater, The University of Georgia

Conceptual Demand of Science Curricula: Studying Practical Work in High School Biology and Geology
Silvia Ferreira, University of Lisbon, Portugal, silviacrferreira@gmail.com
Ana M. Morais, University of Lisbon, Portugal

A Framework of Active Learning by Concept Mapping
Wang-Kun Chen, Jinwen University of Science and Technology, wangkun@just.edu.tw
Ping Wang, Ching Yun University

A Case for Reconceptualizing Coherence in Science Curricula
Tiffany-Rose Sikorski, University of Maryland, College Park, tsikorsk@umd.edu

Connecting Curriculum Materials and Teachers: Elementary Science Teachers’ Enactment of a Reform-based Curricular Unit
Amber M. Schultz, University of Michigan, aschul@umich.edu
Anna Maria Arias, University of Michigan
Elizabeth A. Davis, University of Michigan
Annemarie S. Palincsar, University of Michigan
Strand 11: Cultural, Social, and Gender Issues
Urban Children and Science: Identity, Representation, and Implications for Science Education
10:15am – 11:45am, Room 107

Presider:
Gale A. Seiler, McGill University

Language, Identity, & Cognition: Disaggregating Science Instruction for Urban Students
Bryan A. Brown, Stanford University, brbrown@stanford.edu

The Electricity Went Out and My Teacher Said,
Bhaskar Upadhyay, University of Minnesota, bhaskar@umn.edu
Nancy Albrecht, University of Minnesota
Kristina Maruyama Tank, University of Minnesota
Geoffrey Maruyama, University of Minnesota
Martin Adams, University of Minnesota
Timothy Sheldon, University of Minnesota
Brian Fortney, University of Texas at Austin

Recognition in the Classroom: Examining the Physics Identity Development of Marginalized Students through Case Studies
Carrie E. Beattie, Clemson University, cheatti@g.clemson.edu
Zahra Hazari, Clemson University
Cheryl A.P. Cass, North Carolina State University

Strand 12: Educational Technology
Games, Simulations, Virtual Environments, & GIS
10:15am – 11:45am, Room 101

Presider:
Karen E. Irving, The Ohio State University

Investigating Students’ Ideas about Buoyancy and the Influence of Haptic Feedback
James Minogue, North Carolina State University, james_minogue@ncsu.edu
David Borland, Universitat de Barcelona and IDIBAPS Barcelona, Spain

Integrating Geographic Information Systems in a Science Methods Course-Preservice Teachers
Examining STS Issues
Josephine Shireen Desouza, Ball State University, Muncie, Indiana, jmdesouza@bsu.edu

Immersing Preservice Science Teachers in Serious Educational Games
Leonard A. Annetta, George Mason University, lannetta@gmu.edu
Richard L. Lamb, George Mason University
James Minogue, North Carolina State University
Rebecca Cheng, George Mason University
David B. Vallett, George Mason University
Shawn Y. Holmes, North Carolina State University
Elizabeth Foltz, College of Environmental Science & Forestry

Virtual Learning Environment Preference, Perception of Helpfulness, and Achievement in Taiwanese Earth Science Students
Ming-Chao Lin, National Taiwan Normal University, 89344006@ntnu.edu.tw
Shane Tutwiler, Harvard University
Chun-Yen Chang, National Taiwan Normal University

Strand 13: History, Philosophy, and Sociology of Science
Strand Sponsored Session - Teaching and Assessment of Inquiry and Nature of Science with Early Childhood Students
10:15am – 11:45am, Room 102

Presider:
Norman G. Lederman, Illinois Institute of Technology

Presenters:
Valarie L. Akerson, Indiana University
Judith S. Lederman, Illinois Institute of Technology
Leon Walls, University of Vermont
Gayle A. Buck, Indiana University
Erin Peter Burton, George Mason University

Strand 14: Environmental Education
Science Teacher Education as a Context for Environmental Literacy Improvement
10:15am – 11:45am, Room 103

Presider:
Bryan H. Nichols, University of South Florida

Conceptualizing In-service Secondary School Science Teachers’ Knowledge Base for Climate Change Content
Devarati Bhattacharya, University of Minnesota, Minneapolis, devarati@umn.edu
Engin Karahan, University of Minnesota, Minneapolis
Younkyeong Nam, University of Minnesota, Minneapolis
Jeremy Wang, University of Minnesota, Minneapolis
Shiyu Liu, University of Minnesota, Minneapolis
Benjamin Tierney, University of Minnesota, Minneapolis
Keisha Varma, University of Minnesota
Gillian Roehrig, University of Minnesota
Pre-service Elementary Teachers’ Outdoor Experiences: How Do These Translate into Beliefs on Taking Students Outdoors?
Erica N. Blatt, College of Staten Island, CUNY, erica.blatt@csi.cuny.edu

Exploring Teachers’ Barriers to Implementing System Dynamics Tools for Sustainability Education
Heather J. Skaza, University of Nevada-Las Vegas, skazah@unlv.nevada.edu
Kent J. Crippen, University of Florida
Kristoffer Carroll, Clark County School District

Exploring Science Teacher Attitudes towards Instruction Through Foods, Investigations, Soils, and Healthy Habits (FISHH)
Christopher D. Murakami, University of Missouri, cdmvk7@mail.missouri.edu
Parker E. Stuart, University of Missouri
Stephen B. Witzig, University of Missouri
Anna M. Waldron, University of Missouri

NARST Business Meeting
Box lunch provided for 1st 100 attendees who sign up.
12:00pm – 1:00pm, Room 201 – 202

Concurrent Session #5
1:15pm – 2:45pm

Equity and Ethics Committee Sponsored Session
Symposium - Developing a NARST Code of Ethics
1:15pm – 2:45pm, Room 103

Presenters:
Sarah Barrett, York University, sbarrett@edu.yorku.ca
Julie A. Bianchini, University of California, Santa Barbara
Brian S. Fortney, University of Texas at Austin
J. Randy McGinnis, University of Maryland
Felicia M. Mensah, Teachers College, Columbia University
Matthew Weinstein, University of Washington, Tacoma

International Committee Sponsored Session
Symposium - Contributions from the European Science Education Research Association (ESERA): Addressing Diversity in Science Education through Research about Cultural Diversity of Students, Brain-type and Motivation, Multiple Workplace Policies and Multiple Representations
1:15pm – 2:45pm, Room 313

Presenters:
Sibel Erduran, University of Bristol
Manuela Welzel-Breuer, ESERA, Germany

Dialogic Research in a Diverse Globalizing World: Ways of Valuing Local Voices in Multi-Partner Design Research Including both Developing and Developed Countries
Michiel van Eijck, Eindhoven University of Technology, The Netherlands
Ralf van Griethuijsen, Eindhoven University of Technology, The Netherlands
SiewChieh Choy, Tunku Abdul Rahman College, Malaysia
Saouma B. Boujaoude, American University of Beirut, Lebanon
Sugra Chunawala, Tata Institute of Fundamental Research, India
Chitra Natarajan, Tata Institute of Fundamental Research, India
Huseyin Bag, Pamukkale University, Turkey
Ayse Savran Gencer, Pamukkale University, Turkey
Helen Haste, University of Bath, UK/Harvard Graduate School of Education, USA
Nasser Mansour, University of Exeter, UK
Alan Morgan, University of Exeter, UK
Keith Postlethwaite, University of Exeter, UK

Brain Type- a Cross Cultural Constant of Motivation to Learn Science?
Albert Zeyer, University of Zurich, Switzerland,
Ayla Çetin-Dindar, Middle East Technical University, Ankara, Turkey
Ahmad Nurulazam Md Zain, Universiti Sains, Malaysia
Mojca Jurišič, University of Ljubljana, Slovenia
Iztok Devetak, University of Ljubljana, Slovenia
Freia Odermatt, University of Zurich, Switzerland

Balancing Multiple Policies in the Workplace: Teachers’ Experiences of Science Curriculum Reform
Jim Ryder, University of Leeds, UK,
Indira Banner, University of Leeds, UK
Jim Donnelly, University of Leeds, UK

Jochen Scheid, University of Landau, Germany,
Rosa Hettmannspurger, University of Landau, Germany
Jochen Kuhn, University of Landau, Germany
Wolfgang Schnotz, University of Landau, Germany
Andreas Müllerm, University of Geneva, Switzerland
Strand 1: Science Learning, Understanding and Conceptual Change
Related Paper Set - Immersion into Argument-based Inquiry: Understanding Critical Elements for Classroom Practice
1:15pm – 2:45pm, Room 310
Discussants: Brian M. Hand, University of Iowa

The Effect of the SWH Implementation in Turkish School System: Results from a Scale-up Research Project
Murat Gunel, AHT Euran University, mgunel@yahoo.com
Recai Akkus, Abant Izzet Baysal University, Turkey
Melike Ozer-Keskin, Gazi University, Turkey
Nilay Keskin-Samanci, Gazi University, Turkey

The Impacts of Writing in Argument-Based Inquiry on Science Learning
Hyeongjeong Kil, Pusan National University, hj9620@hanmail.net
Jeonghee Nam, Pusan National University

Modeling Scientific Communication with Multimodal Writing Tasks: Impact on Students at Different Grade Levels
Mark McDermott, Wartburg College, mark.mcdermott@wartburg.edu
Audrey Sturtz, Manson-NW Webster High School
Jake Mohling, Humboldt Middle School

Examing Professional Development Programs and PD Leaders’ Orientation to Immersive Argument-based Inquiry Practices
Mary Grace Villanueva, University of Iowa, marygrace-villanueva@uiowa.edu
Brian M. Hand, University of Iowa

Argument as a Linchpin between Learning, Teaching, and Science: Conceptualizing Science Instruction as Argument
Andy Cavagnetto, Binghamton University, acavagne@binghamton.edu

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Related Paper Set - High School Science Teacher Professional Cultures that Successfully Retain Teachers and Prepare Students in Science
1:15pm – 2:45pm, Room 302
Presider: Carol L. Stuessy, Texas A&M University
Discussant: Timothy Scott, Texas A&M University

Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies
Science as Inquiry
1:15pm – 2:45pm, Room 301
Presider: Fouad Abd-El-Khalick, University of Illinois at Urbana-Champaign

Implications for Higher Education and the Preparation of High School Science Teachers
Timothy Scott, Texas A&M University, tims@science.tamu.edu
Characteristics of Scientifically-oriented Questions and the Nature of Inquiry in Elementary Classrooms: A Multiple-case Study
Claudia P. Aguirre-Mendez, The University of Iowa, claudiapatricia-aguirre-mendez@uiowa.edu
Nattida Promyod, University of Iowa
Gory T. Forbes, University of Iowa
Mandy Biggers, University of Iowa
Laura Zangori, University of Iowa

Cultural Themes as the Center of Inquiry Science Curricula in American Indian Head Start Classrooms
Mia Dubosarsky, University of Minnesota, dubo0053@umn.edu
Gillian Roehrig, University of Minnesota
Stephan Carlson, University of Minnesota
Jennifer Jones, University of Minnesota
Barb Murphy, University of Minnesota
Linda Frost, University of Minnesota

The Impact of Equitable and Inquiry-based Science Teaching on American Indian Students’ Test Scores
Bruna Irene Grimberg, grimberg@montana.edu
Edith Gummer
Judith Devine

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies
Related Paper Set - Promoting Reform through Instructional Materials that Educate
1:15pm – 2:45pm, Room 303

Part 1 of the Intervention: Educative Curriculum Materials
Janet Carlson, BSCS, jcarlson@bscs.org
Joseph A. Taylor, Biological Science Curriculum Study
April L. Gardner, Biological Science Curriculum Study
Julie Gess-Newsome, Willamette University

Part 2 of the Intervention: Curriculum-based, Transformative Professional Development
April L. Gardner, Biological Science Curriculum Study, agardner@bscs.org
Janet Carlson, BSCS
Julie Gess-Newsome, Willamette University

Linking the Intervention to the Evidence (or Linking the Evidence to the Intervention)
Molly Stuhlsatz, BSCS, mstuhlsatz@bscs.org
Joseph A. Taylor, Biological Science Curriculum Study
April L. Gardner, Biological Science Curriculum Study
Julie Gess-Newsome, Willamette University
Janet Carlson, BSCS
Christopher Wilson, BSCS

Considering Personal and Contextual Influences
Julie Gess-Newsome, Willamette University, jgessnew@willamette.edu
April L. Gardner, Biological Science Curriculum Study
Janet Carlson, BSCS
Joseph A. Taylor, Biological Science Curriculum Study

Strand 5: College Science Teaching and Learning (Grades 13-20)
Argumentation in Science Learning
1:15pm – 2:45pm, Room 304
Presider:
Vicente A. Talanquer, University of Arizona

Using a Science Laboratory Course to Enhance Undergraduate Students’ Arguments Related to Socioscientific Issues
Jonathon Grooms, The Florida State University, jgrooms@fsu.edu
Victor D. Sampson, Florida State University

Exploring the Impact of Argumentation on College Students’ Conceptual Understanding of The Properties and Behavior of Gases
Mehmet Aydeniz, The University of Tennessee, maydeniz@utk.edu
Pinar Cetin, Bolu Abant Izzet Baysal University
Aybuke Pabuccu, Bolu Abant Izzet Baysal University
Ebru Kaya, Selcuk University

Negotiation and Argumentation among Engineering Students
Nicholas Fila, Purdue University, nfila@purdue.edu
Senay Purzer, Purdue University

Disjunction as a Facilitator to Enhance Argumentation Quality in Problem-Based Learning
Chia-Hui Hung, National Taiwan Normal University, beautycathy1121@gmail.com
Chen-Yung Lin, National Taiwan Normal University

Strand 5: College Science Teaching and Learning (Grades 13-20)
College Faculty Development
1:15pm – 2:45pm, Room 309
Presider:
Grant E. Gardner, East Carolina University

Faculty Development via Sharing and Documenting Course Activities for Flexible Adoption/Adaptation across Multiple Institutions
Dedra N. Demaree, Oregon State University, demaree@physics.oregonstate.edu
Sissi L. Li, Oregon State University
Nam-Hwa Kang, Oregon State University
Dennis Gilbert, Lane Community College
Gregory Mulder, Linn-Benton Community College
Corinne Manogue, Oregon State University
Developing the Grass-Roots Choir: STEM Faculty Agency In Undergraduate Reform
Jana Bouwma-Gearhart, University of Kentucky, jlbo226@uky.edu

Constructing College Chemistry Instructors’ Worldviews
Mary Chang, mkbchang@hawaii.edu

Preparation of University Graduate Teaching Assistants: Challenges, Expectations and Participation in Professional Development Activities
Gili Marbach-Ad, University of Maryland, gilim@umd.edu
Kathryn L. Schaefer, University of Maryland
Katerina V. Thompson, University of Maryland

Strand 6: Science Learning in Informal Contexts
Tools and Technologies Facilitating Informal Learning
1:15pm – 2:45pm, Room 305

Presider:
Leonie J. Rennie, Curtin University of Technology

Evaluation of an Out-of-School Time (OST) Genetics Program using a Multidimensional Conceptual Change Perspective
Marty D. Coon, Van Andel Education Institute, marty.coon@vai.org

Merging Playfulness with the Formal Science Curriculum in an Outdoor Learning Environment
Nir Orion, Weizmann Institute of Science, nir.orion@weizmann.ac.il
Molly L. Yunker, Weizmann Institute of Science

The Range of Science Instructional Materials used in a Statewide Afterschool Program
Ruchi T. Bhanot, SRI International, ruchi.bhanot@sri.com
Christopher J. Harris, SRI International
Ann House, SRI International
Carlin Llorente, SRI International

Bridging Inquiry across Settings Using Mobile and Curricular Supports
Clara Suzanne Cahill, University of Michigan, claracah@umich.edu
Shannon E. Schmoll, University of Michigan
Ibrahim Delen, University of Michigan
Wan-Tzu Lo, University of Michigan
Alex Kuhn, University of Michigan
Brenna McNally, University of Michigan
Chris Quintana, University of Michigan
Joseph S. Krajcik, Michigan State University

Strand 7: Pre-service Science Teacher Education
Elementary Science Teacher Preparation II
1:15pm – 2:45pm, Room 306

Presider:
Josephine Shireen Desouza, Ball State University

Preservice Elementary Teachers use of Discourse Moves to Support the Social Construction of Science Concepts
Elisebeth Boyer, Penn State University, eboyer@psu.edu
Carla Zembal-Saul, Penn State University

Re-thinking Early Field Experiences For the Purpose of Preparing Elementary Preservice Teachers Pedagogical Content Knowledge
Vanashri Nargund-Joshi, Indiana University, Bloomington, vnargund@indiana.edu
Meredith A. Park Rogers, Indiana University
Heidi L. Wiebke, Indiana University, Bloomington
Valerie L. Akerson, Indiana University

Response-shift Bias of Internal and External Standards in Elementary Science Pre-service Teachers
Tina Cartwright, Marshall University, tina.cartwright@marshall.edu
Jon Atwood, Marshall University

Structured Communities, Science Instruction Development, and the Use Of Digital Media in A Pre-Service Elementary Teacher Education Program
Steven D. Wall, University of North Carolina at Chapel Hill, dodd220@aol.com
Janice L. Anderson, University of North Carolina at Chapel Hill
Julie E. Justice, University of North Carolina at Chapel Hill
Jennifer Jones-Gorham, University of North Carolina at Chapel Hill
Kat Nichols, University of North Carolina at Chapel Hill
Ashley Boyd, University of North Carolina at Chapel Hill
Jonathan Bartels, University of North Carolina at Chapel Hill

Strand 8: In-service Science Teacher Education
Models for Promoting Teacher Learning
1:15pm – 2:45pm, Room 105

Presider:
Tamara H. Nelson, Washington State University Vancouver

Teacher-learning Processes During Professional Development: Conceptual Change and Metacognitive Analyses
Hedi B. Lauffer, University of Wisconsin-Madison, hfbaxter@wisc.edu
Peter W. Hewson, University of Wisconsin-Madison
Perspectives on Teaching and Learning to Teach from Students and Teachers in a Teacher-Developed Situated PD Model
Rachel Ruggirello, Washington University in St. Louis, ruggirello@wustl.edu
Phyllis Balcerzak, Washington University
Vicki May, Washington University in St. Louis
Jill Menew, Washington University

Change in Teachers’ Instructional Practices Over Time: The Effects of Master’s Program on Science Instruction
Yasemin Copur Gencturk, University of Illinois at Urbana-Champaign, ycopur2@illinois.edu
Barbara Hug, University of Illinois at Urbana-Champaign

Is it Possible to Explicitly Stimulate Pedagogical Discontentment in Science Teachers through a Graduate Course?
Margaret R. Blanchard, North Carolina State University, meg Blanchard@ncsu.edu
Jason W. Osborne, Old Dominion University
Jennifer L. Albert, North Carolina State University

Strand 8: In-service Science Teacher Education
Teacher Conceptions of Life Science
1:15pm – 2:45pm, Room 106
Presider:
Jan H. Van Driel, Leiden University

In-service Biology Teachers’ Perceptions and Adaptation of Evolution Issue into the Curriculum
Yilmaz Kara, Karadeniz Technical University, yilmazkaanlara@yahoo.com

The Impact of a Science Teacher Professional Development Program on Evolution Knowledge, Misconceptions, and Acceptance
Brian C. Baldwin, Kean University, bbaldwin@kean.edu
Minsu Ha, The Ohio State University
Ross H. Nehm, The Ohio State University

Characteristics of Teachers and Professional Development that Predict Growth in Life Science Content Knowledge
Thomas R. Tretter, University of Louisville, tretter@louisville.edu
Stephanie B. Philipp, University of Louisville
Sherri L. Brown, University of Louisville

Strand 10: Curriculum, Evaluation, and Assessment
Construct, Item, and Instrument Validation Studies
1:15pm – 2:45pm, Room 308
Presider:
Cari F. Herrmann Abell, AAAS/Project 2061

Investigating Development on a Force and Motion Learning Progression
Irene Neumann, Leibniz Institute for Science and Mathematics Education, nieumann@ipn.uni-kiel.de
Gavin W. Fulmer, National Science Foundation
Ling L. Liang, La Salle University
Knut Neumann, Leibniz Institute for Science Education (IPN) Kiel

Item Context: How Organisms Used to Frame Natural Selection Items Influence Student Response Choices
Sara C. Heredia, University of Colorado, Boulder, sara.heredia@colorado.edu
Erin M. Furtak, University of Colorado
Deborah L. Morrison, University of Colorado

Utilizing Ordered Multiple Choice Items to Assess Students’ Understanding of the Matter Concept
Jan Christoph Hadenfeldt, Leibniz Institute for Science Education (IPN) Kiel, hadenfeldt@ipn.uni-kiel.de
Knut Neumann, Leibniz Institute for Science Education (IPN) Kiel

Strand 11: Cultural, Social, and Gender Issues
Investigating Women’ Identities and Career Trajectories in Science
1:15pm – 2:45pm, Room 107
Presider:
Femi Otulaja, University of Witwatersrand

How Did They Do It? Career and Family Together Among Successful Women Science Educators in Both Formal and Informal Settings
Phyllis Katz, University of Maryland, pkatz15@gmail.com
Vanessa Wyss, Ball State University
Robert H. Tai, University of Virginia

Exploring the Longitudinal Professional Development of Teachers to Teach for Diversity through Sociotransformative Constructivism (sTc)
Alberto J. Rodriguez, San Diego State University, arodrigu@mail.sdsu.edu

Female Physicist Doctoral Experiences and Career Choice Factors
Katherine P. Dabney, University of Virginia, kd3c@virginia.edu
Vanessa Wyss, Ball State University
Robert H. Tai, University of Virginia
African American Female Faculty Members: Factors Influencing their Recruitment, Retention and Promotion at Traditionally White Institutions
Natasha Johnson, The University of Georgia Athens, GA, yjohnson@uga.edu
Mary M. Arwater, The University of Georgia
Malcolm B. Butler, University of South Florida, St Petersburg
Eileen C. Parsons, University of North Carolina at Chapel Hill
Tonjua B. Freeman, The University of Georgia

Strand 12: Educational Technology
Transforming Teaching with Technology
1:15pm – 2:45pm, Room 101

President:
Janell Nicole Catlin, Teachers College, Columbia University

The Effect of Using Representations of Reified Objects in a Simulation on Students’ Conceptual Understanding
Georgios Olympiou, University of Cyprus, olympiog@ucy.ac.cy
Zacharias C. Zacharia, University of Cyprus
Ton de Jong, University of Twente

Using Technology to Address Non-Traditional Learning Objectives in an Undergraduate General Chemistry Course
Ted M. Clark, The Ohio State University, clark.789@osu.edu
Robert P. Griffiths, The Ohio State University

High School Students’ Development of ICT Fluency/Workforce Skills by Designing a Virtual Science Center
Camille Ferguson, EDC’s Center for Children and Technology, cferguson@edc.org
Preeti Gupta, New York Hall of Science

Strand 13: History, Philosophy, and Sociology of Science
Standards in the History, Philosophy & Sociology of Science
1:15pm – 2:45pm, Room 102

President:
Catherine E. Milne, New York University

Teaching Physics as One of the Humanities the History of Harvard Project Physics, 1962-1970
David Meshoulam, University of Wisconsin-Madison, meshoulam@wisc.edu

Comprehensiveness and Completeness of Nature of Science in State Standards: Update and Report Card
William F. Mccomas, University of Arkansas, mccomas@uark.edu
Carole K. Lee, University of Maine Farmington
Sophia J. Sweeney, Northeastern State University

Is the Integration of Engineering Design Into K-12 Science Curriculum Prudent?
Miancheng Guo, Illinois Institute of Technology, mguo7@hawk.iit.edu
Norman G. Lederman, Illinois Institute of Technology

Strand 15: Policy
Curriculum Development
1:15pm – 2:45pm, Room 104

President:
Michelle P. Cook, Clemson University

Science Teachers’ Views of Factors that Affect Urban Physics Accessibility and Participation
Angela M. Kelly, Stony Brook University, angela.kelly@stonybrook.edu

Consequences of School Improvement: Examination of the Association between School Improvement and Student Science Achievement
Adam V. Maltese, Indiana University, amaltese@indiana.edu
Craig D. Hochbein, University of Louisville

Challenges in Transition to a Large-Scale Reform in Chemical Education
Shirly Avargil, Israel Institute of Technology, Haifa, Israel, savargil@technion.ac.il
Ort Herscovitz, Israel Institute of Technology, Haifa, Israel
Yehudit Judy Dori, Department of Education in Technology and Science

Self-Efficacy, Organizational Culture and Change: Engaging Science and Mathematics Faculty in a New Policy-Based Initiative
Abdulkadir Demir, Georgia State University, abdulkadir_di@yahoo.com
Chad Ellef, CDE Research Associates, Inc.
Lisa M. Martin-Hansen, Georgia State University
Judy Awong-Taylor, Georgia Gwinnett College
Nancy Vandergrift, University of Georgia

Re-imagining Nature of Science: Implications for Policy and Research
Zoubeida R. Dagher, University of Delaware, zoubeida@udel.edu
Break
2:45pm – 3:15pm, Griffin Exhibit Hall

Concurrent Session #6
All strand poster sessions.
3:15pm – 5:15pm

Poster Session A
3:15pm – 4:15pm, Griffin Exhibit Hall

Strand 1: Science Learning, Understanding and Conceptual Change
Poster Session A
3:15pm – 4:15pm, Griffin Exhibit Hall

A1. The Effect of Studying Socio-scientific Issues on Pre-service Teachers’ Understanding of the Nature of Science
Kristin L. Cook, Indiana University, kshockey@indiana.edu
Gayle A. Buck, Indiana University

Catherine E. Milne, New York University, cem4@nyu.edu
Jan Plass, New York University
Bruce Horner, Graduate Center, City University of New York
Trace Jordan, New York University
Ruth Schwartz, New York University
Dixie Ching, New York University
Mubina Kahn, New York University
Yolanta Kornack, Graduate Center, City University of New York
Anna G. Brady, New York University

A5. Exposing Differences between Korean and American College Students’ Evolution Concepts and Attitudes
Seulae Ku, Korea National University of Education, damakoo@gmail.com
Minsu Ha, The Ohio State University
Heeyoung Cha, Korea National University of Education

A7. Cognitive Processes Used by High and Low Prior Knowledge Students When Interpreting Graphics
Michelle P. Cook, Clemson University, mcook@clemson.edu

A9. Situational Interest and Cognitive Conflict as Factors Influencing Conceptual Change
Lawrence C. Scharmann, Florida State University (USA), lscharmann@fsu.edu
Hunsik Kang, Chuncheon National University of Education (Korea)
Sukjin Kang, Jeonju National University of Education (Korea)
Taehee Noh, Seoul National University (Korea)

A11. Analysis of Associations among the Factors Affecting on Secondary School Students’ Conception about Evolution
Mihyun Joo, Guri Girls Middle School, joojulie@hanmail.net
Minsu Ha, The Ohio State University
Seulae Ku, Korea National University of Education
Heeyoung Cha, Korea National University of Education
Jeong-rae Kim
Eun-young Hwang

A13. Impact of Evolution Instruction on Understanding and Acceptance of Evolutionary Theory and the Nature of Relationships among Understanding, Acceptance, and Religiosity
Hasan Deniz, University of Nevada Las Vegas, hasan.deniz@unlv.edu
Peter G. Schrader, University of Nevada Las Vegas
Joshua Keilty, The Alexander Dawson School Las Vegas

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Poster Session A
3:15pm – 4:15pm, Griffin Exhibit Hall

A15. Analysis of Inquiry Studies by Using Interactive-Constructive-Active Framework
Muhsin Menelise, Arizona State University, mulsin@asu.edu
Michelene Chi, Arizona State University
Omid Vasefi, Arizona State University

A17. Facilitating Student Creativity in Scientific Inquiry: An Exploration of Secondary Chemistry Classrooms
Allison Antink Meyer, Illinois Institute of Technology, aantink@hawk.iit.edu
Norman G. Lederman, Illinois Institute of Technology

A19. High School Youths’ Reactions to and Perceptions of STEM Project-Based Learning
Leah A. Bricker, University of Washington, lbricker@u.washington.edu
Katie Van Horne, University of Washington

A21. Authentic vs. Vicarious: An Analysis of Environmental Education in Different Learning Contexts
Jeffrey Nordine, Trinity University, jnordine@trinity.edu
Courtney Lambert Crim, Trinity University
A23. The Interplay between Student and Material Agency in Ecological Investigations
Michelle Cotterman, Vanderbilt University; michelle.e.cotterman@vanderbilt.edu
Richard Lehrer, Vanderbilt University
Leona Schauble, Vanderbilt University/Peabody College

Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies
Poster Session A
3:15pm – 4:15pm, Griffin Exhibit Hall

A25. Teacher Strategies to Implement the Argument-Based Inquiry Approach
Aeran Choi, Kent State University, aeran-choi@hotmail.com
Vanessa Klein, Kent State University
Susan Hershberger, Miami University

A27. Classroom Perspectives: Observation of the Implementation of a Fourth Grade Immersion Science Inquiry Curriculum
Irene U. Osisioma, California State University Dominguez Hills, Carson California, iosisioma@csudh.edu
Shirley Lal, California State University Dominguez Hills, Carson California

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies
Poster Session A
3:15pm – 4:15pm, Griffin Exhibit Hall

A29. Examining High School Students’ Understandings of Molecular Genetics
Amber Todd, Wright State University, rosenberg.5@wright.edu
Lisa Kenyon, Wright State University

A33. Rethinking Expertise in Physics: An Investigation of Expertise in High School Physics Teachers
Kara Krinks, Vanderbilt University, kara.krinks@vanderbilt.edu
Pratim Sengupta, Vanderbilt University

A35. Using PISA 2006 Data to Explore the Relationship between Inquiry Teaching and Student Science Achievement
Feng Jiang, University of Arkansas, fjiang@uark.edu
William F. Mccornas, University of Arkansas

A37. Instructional Strategies for Nano-science and Technology: A Case Study of Three Experienced Teachers
Kun-Yi Shih, National Changhua University of Education, Taiwan, latticewine@gmail.com
Huey-Por Chang, National Changhua University of Education, Taiwan
Kuo-Hua Wang, National Changhua University of Education, Taiwan

Strand 5: College Science Teaching and Learning (Grades 13-20)
Poster Session A
3:15pm – 4:15pm, Griffin Exhibit Hall

A39. Anyone Can Draw a Scientist, but How Realistic is this Portrayal? A Study Examining Change in Preservice Students’ Conceptions of Scientists Using Multimedia Films
Catherine Kochler, University of New Haven, ckoehler@newhaven.edu
Ian C. Binns, University of North Carolina-Charlotte
Mark Bloom, Texas Christian University

A41. Transforming Cambodian University Science from Lecture to Inquiry: Cultural Barriers and Student Responses
Gail L. Dickinson, Texas State University, San Marcos, dickinson@txstate.edu
Heather C. Galloway, Texas State University, San Marcos
Maureen Lernke, Texas State University, San Marcos
David Ford, Royal University of Phnom Penh

A43. The Focus and Relationships Negotiated During Undergraduate Science Instructor Mentoring
Cynthia C. Deaton, Clemson University, cdeaton@clemson.edu
Benjamin Deaton, Anderson University

A45. Engaging STEM Students from the Beginning: An Interdisciplinary Approach to Introductory Biology and Chemistry Laboratories
John R. Geiser, Western Michigan University, john.geiser@wmich.edu
Renee S. Schwartz, Western Michigan University
Leonard Ginsberg, Western Michigan University
Donald Schreiber, Western Michigan University

A47. Undergraduate Biology Students’ Conceptions of Fungi
Andrea Bierema, Western Michigan University, andrea.m.kryger@wmich.edu
Renee S. Schwartz, Western Michigan University

A49. Learning about Error with a Virtual Laboratory: Evidence from a Biomedical Engineering Course
Eva Erdosne Toth, West Virginia University, eva.toth@mail.wvu.edu
Cerasela-Zoica Dinu, West Virginia University, Department of Chemical Engineering
A51. Assessment of Argumentation Skills through Individual Written Instruments and Lab Reports in Introductory Biology
Melissa Schen, Wright State University, melissa.schen@wright.edu

A53. Exploring the EEG Dynamic during Physics Problem Solving
Hsiao-Ching She, Institute of Education, National Chiao Tung University, hshe@mail.nctu.edu.tw
Wen-Chi Chou, Institute of Education, National Chiao Tung University
Tzyy-Ping Jung, Institute of Neurocomputation, University of San Diego, USA

A55. College Students’ Mental Models and Predictions: An Example of Heat Convection
Guo-Li Chiou, National Chiao Tung University, Taiwan,
ge2158@columbia.edu

A57. Interviews and Content Representation for Teaching Condensed Matter Bonding: An Affective Component of PCK?
Andoni Garritt, Universidad Nacional Autonoma de Mexico, andoni@servidor.unam.mx
Norma A. Ortiga-Villar, Universidad Nacional Autonoma de Mexico

Strand 6: Science Learning in Informal Contexts
Poster Session A
3:15pm – 4:15pm, Griffin Exhibit Hall

A59. Dealing with Troubles by Pedagogical Repairs in Science Internship
Pei-Ling Hsu, University of Texas at El Paso, phsu3@utep.edu

A61. After School Science Club: Learning Science Inside the Box Outside-of-School-Time
Kim Sadler, Middle Tennessee State University, ksadler@mtsu.edu
Leigh Gostowski, Middle Tennessee State University
Linda Gilbert, Murfreesboro City Schools
Emily Newton, Middle Tennessee State University
David Green, Middle Tennessee State University

A63. The Relevance of the Science Curriculum: Scientific Concepts in Online Public Discussion Concerning Animal Experimentation
Ayelet Baram-Tsabari, Technion - Israel Institute of Technology, ayelet@technion.ac.il
Esther Laslo, Technion - Israel Institute of Technology

A65. What Do Zoological Institution’s Websites Communicate to the Public about Education Programs?
Patricia Patrick, Texas Tech University, trish.patterson@ttu.edu

A67. Exploring a Summer Camp Based on Robotics Activities Prepared for Underrepresented Groups: A Pilot Study
Niyazi Erdogan, Texas A&M University, niyazierdogan@tamu.edu
Mehmet Ayar, Texas A&M University
Seneer Corlu, Texas A&M University
Mary M. Caprauro, Texas A&M University
Alpaslan Sahin, Texas A&M University

A69. Taiwanese Children’s Conceptions and Relations to Nature: Using the Contextual Model of Learning as the Theoretical Framework
Amy H. Dai, University of Maryland, amydailey@umd.edu

Strand 7: Pre-service Science Teacher Education
Poster Session A
3:15pm – 4:15pm, Griffin Exhibit Hall

A71. Developing Preservice Teachers’ Science Teaching in an Elementary Science Methods Course: An Activity-Theoretical Perspective
Amanda Benedict-Chambers, University of Michigan, mbenedich@umich.edu

A73. Subject Matter Equivalencies: Are All Majors Equal?
Beth W. Kubitskey, Eastern Michigan University, mkubitskey@emich.edu

A75. Constructing Views of Theory-Practice Relationships in a Content-Specific Methods Course for Prospective Teachers
Gabriel M. Viana, Universidade Federal de Minas Gerais, Brazil, gabriel@witt.acil
Danusa Munford, College of Education - Universidade Federal de Minas Gerais, Brazil
Luciana Moro, Biosciences Institute - Universidade Federal de Minas Gerais, Brazil
Márcia F. Serra, College of Education - Universidade Federal do Rio de Janeiro, Brazil

A77. Promoting Science Learning through Reading: Practices in the Classroom of a Prospective Science Teacher
Natalia A. Ribeiro, Universidade Federal de Minas Gerais, Brazil, natalia@nceribeiro@gmail.com
Danusa Munford, Universidade Federal de Minas Gerais, Brazil
Diego O. Silva, Universidade Federal de Minas Gerais, Brazil
Ana Paula S Souza, Universidade Federal de Minas Gerais, Brazil

A79. Partners in Denial? A Link Found between Ecological Worldview and Attitudes toward Teaching Evolution
Bryan H. Nichols, University of South Florida, bryanhnichols@gmail.com
A81. Are We Failing to Prepare 21st Century Teachers for Diversity Lost?: Climate’s Influence on Evolution
Norman Thomson, University of Georgia, nthomson@uga.edu
Deborah Tippins, University of Georgia
Rene Bobe, University of Georgia
Anna Scott, Athens Academy Upper School
Leonard Bloch, University of Georgia
Bahadir Namdar, University of Georgia
Sarah Hakala, University of Georgia

A83. The Influence of Theory and Research on Science Teacher Preparation Program Design
Gail Richmond, Michigan State University, gailr@msu.edu

Strand 8: In-service Science Teacher Education
Poster Session A
3:15pm – 4:15pm, Griffin Exhibit Hall

A85. Training Teacher Leaders in Science and Math: The Science and Math Fellows Program
Andre M. Green, The University of South Alabama, green@usouthal.edu
Andrea M. Kent, The University of South Alabama
Phillip Feldman, The University of South Alabama
James Van Haneghan, The University of South Alabama
Shelly Rader, The University of South Alabama

A87. Re-Imagining Research Now: A Community Partnership Engaged in Improving Science Education
Alan B. Sowards, Stephen F. Austin State University, asowards@sfasu.edu
Cheryl T. Boyette, Informal Science Educators Association Boyette Consulting
Alison Pierce, Humble ISD
Lisa K. Doughty, Waste Management

A89. An Integrated Approach to In-service STEM Education in a Title One Elementary School
Carolyn A. Parker, The Johns Hopkins University, carolyn.parker@jhu.edu
Francine W. Johnson, The Johns Hopkins University

A91. Unexpected Allies: Advancing Scientific Literacy in an Interdisciplinary Context
Billy McChune, Queen’s University Belfast, wmcchune@qub.ac.uk
Ruth Jarman, Queen’s University Belfast

A93. High School Chemistry Teachers’ Assessment Literacy
Shannon M. Burcks, University of Missouri-Columbia, burcksms@missouri.edu
Marcelle A. Siegel, University of Missouri-Columbia
Kemal Izei, University of Missouri Columbia
Stephen W. Witzig, University of Missouri-Columbia
Steven W. Keller, University of Missouri-Columbia

A95. Building Middle School Science Teachers’ Understanding about Scientific Inquiry Using Secondary Research
Jamie Mikeska, Michigan State University, jamiemik@yahoo.com
Patricia S. Bills, Michigan State University
Kenne Dibner, Michigan State University
Suzanne Wilson, Michigan State University
James Short, American Museum of Natural History
Robyn Carlson, Michigan State University
Suzanne Elgendy, American Museum of Natural History

Strand 9: Reflective Practice
Poster Session A
3:15pm – 4:15pm, Griffin Exhibit Hall

A97. How Teachers Make Sense of Their Beliefs to Be Congruent with Practice: Sensible System Framework
Nattida Promyod, University of Iowa, nattida-promyod@uiowa.edu
Soonhye Park, University of Iowa

Strand 10: Curriculum, Evaluation, and Assessment
Poster Session A
3:15pm – 4:15pm, Griffin Exhibit Hall

A99. Designing Student Assessments for Understanding, Constructing and Critiquing Arguments in Science
Katherine L. McNeill, Boston College, kmcneill@bc.edu
Seth Corrigan, Lawrence Hall of Science
Jacqueline Barber, Lawrence Hall of Science
Megan Goss, Lawrence Hall of Science
Amanda M. Knight, Boston College

A101. Performance Assessment of Science Competencies That Normally Go Unassessed
Penny J. Gilmer, Florida State University, gilmer@chem.fsu.edu
Albert Oosterhof, Florida State University
Danielle Sheridan, Florida State University
Adam LaMee, Florida State University

A103. Translation and Validation of the Reformed Teaching Observation Protocol (RTOP) into Turkish
Mustafa S. Topcu, Mugla University, msamitopcu@gmail.com
Tugba Temiz, Yuzuncu Yil University

A105. Assessing Interdisciplinary Understanding in Science: The IT3 Framework
Ji Shen, University of Georgia, jishen@uga.edu
Shannon Sung, University of Georgia
Wendell F. Rogers, Jr., University of Georgia
A107. Developing Computer Model-Based Formative Assessments for High School Chemistry
Xiufeng Liu, State University of New York At Buffalo (SUNY), xliu5@buffalo.edu
Noemi Waight, University at Buffalo
Roberto Gregorious, Canisius College
Erica L. Smith, University of Buffalo

A109. Leveraging Formative Assessment to Foster Scientific Argumentation among Students in a Middle School Classroom
Gayle A. Buck, Indiana University Bloomington, gabuck@indiana.edu
Amy Trauth-Nare, Indiana University
Jianlan Wang, Indiana University

A111. Towards a Measure of Representational Competence (RC) in Science
Christine D. Tippett, University of Victoria, chris.tee@shaw.ca
Sandra Nitz, IPN

Strand 11: Cultural, Social, and Gender Issues
Poster Session A
3:15pm – 4:15pm, Griffin Exhibit Hall

A113. A Call for Environmental Justice Education for Pre-Service and In-Service Teachers
Jodi Devonshire, University of Missouri-St. Louis, jodidevonshire@gmail.com

A115. Becoming an Activist Science Teacher: a Longitudinal Case Study of an Induction Intervention
Sarah Barrett, York University, sbarrett@edu.yorku.ca

A117. A “B” Isn’t Good Enough: Gendered Expectations for ELL Students’ Science Achievement and Participation
Kathryn Scantlebury, University of Delaware, kscantle@adel.edu
Beth A. Wassell, Rowan University
Sonya N. Martin, Seoul National University

A119. (Re)Visions of Science and Science Teaching: Students of Color Transforming Their Ideas of Teaching Science in Urban Schools
Felicia M. Mensah, Teachers College, Columbia University, moorefe@tc.columbia.edu
Iesha Jackson, Teachers College, Columbia University

A121. Narratives and Interactional Self-construction: Why are All the Cree Students Chatting Together About Science?
Gale A. Seiler, McGill University, gale.seiler@mcgill.ca

A123. Using the 5R Instructional Model to Develop Content Knowledge and Language in Science for ELLs
Molly H. Weinburgh, Texas Christian University, m.weinburgh@tcu.edu
Cecilia Silva, Texas Christian University

Strand 12: Educational Technology
Poster Session A
3:15pm – 4:15pm, Griffin Exhibit Hall

A125. Video Games in Middle School Science: Overcoming Spore’s Flaws to Promote Conceptual Understanding
Peter G. Schrader, University of Nevada, Las Vegas, pg.schrader@unlv.edu
Hasan Deniz, University of Nevada, Las Vegas
Joshua Keilty, The Alexander Dawson School at Rainbow Mountain

A127. From Tree to Map: Using Digital Tools to Update Metaphors for Evolution
Sonia H. Stephens, University of Central Florida, sonias@knights.ucf.edu

A129. Enhancing Lifelong Learning among STEM Graduate Students via Distance Learning
Rania Hussein-Farraj, Technion-Israel Institute of Technology, rania1r2@technion.ac.il
Miri Barak, Technion, Israel Institute of Technology
Yehudit Judy Dori, Israel Institute of Technology, Haifa, Israel

A131. How Wetlab and Database-Centered Research Experiences Influence High School Students’ Perceptions of Authentic Scientific Practice
Maureen Munn, University of Washington, mmunn@uw.edu
Randy Kruth, Kruth Research Inc.
Katie Van Horne, University of Washington
Hiroki Oura, University of Washington
Andrew W. Shouse, University of Washington

A133. Developing Technological Pedagogical Content Knowledge in an Experiential Environmental Science Course Using Geospatial Technologies
Rita Hagevik, The University of North Carolina at Pembroke, rita.hagevik@uncp.edu
Patty Stinger-Barnes, The University of Tennessee
Jessica Horton, The University of Tennessee
**Strand 13: History, Philosophy, and Sociology of Science**
**Poster Session A**
3:15pm – 4:15pm, Griffin Exhibit Hall

**A135. Science Teachers’ Views about Teaching Socioscientific Issues: Understandings, Experiences and Suggestions**
Ahmet Kilinc, ahmet_tr@yahoo.com
Dilber Babceci
Umit Demiral
Nagihan Tanik
Baris Eroglu
Kasim Yildirim
Ozkan Gongulu
Ozlem Afacan
Mutlu Pinar Demirci Guler
Azru Soramez

**A137. Understanding Research Paradigms: Trends in Science Education Research**
Sebastian P. Szyjka, sp-szyjka@wiu.edu

**A139. (Re)Examining Standards: Challenging Epistemological Assumptions of the National Education Science Standards**
Jesse T. Bazzul, OISE University of Toronto, jesse.bazzul@utoronto.ca

**A141. What Can We Learn About the Public’s Understanding of the Nature of Science from a Popular, Open-access ‘AskScience’ Website?**
Leigh S. Arino De La Rubia, Tennessee State University, leigh.arinodelarubia@gmail.com

**A143. What Makes Chemistry Unique? An Exploratory Study of Graduate Students’ Conceptions**
Paulo A. Porto, Instituto de Química - Universidade de São Paulo (Brasil), palporto@iq.usp.br
Anielli F. G. Lemes, Instituto de Química - Universidade de São Paulo (Brasil)

**Strand 14: Environmental Education**
**Poster Session A**
3:15pm – 4:15pm, Griffin Exhibit Hall

**A145. Perceptions of Animals in Primary School Children**
Clara Vasconcelos, Faculdade de Ciências da Universidade do Porto, cvascon@fc.up.pt
António Almeida, Centro de Geologia da Universidade do Porto, Portugal

**A149. Preservice Elementary Science Teachers’ Conceptions of Sustainability: A Phenomenographic Approach**
Rita Hagevik, The University of North Carolina at Pembroke, rita.hagevik@uncp.edu
Jessica Horton, The University of Tennessee
Dorothy Blanks, The University of Tennessee

**A151. Which One Predict University Students’ Pro-environmental Behavior More? Nature Relatedness or Environmental Motive Concern?**
Güliz Karanar, Agri Ibrahim Cecen University
Bingul Calik, Agri Ibrahim Cecen University
Elvan Sahin, Middle East Technical University
Hamide Ertepinar, Middle East Technical University
Ozlem Oktay, Middle East Technical University

**Strand 15: Policy**
**Poster Session A**
3:15pm – 4:15pm, Griffin Exhibit Hall

**A153. Estimating the Influence of Course-Taking Patterns and English Language Proficiency on Science Achievement**
Zoe E. Buck, University of California, Santa Cruz, zbuck@ucsc.edu
Saul Maldonado, University of California, Santa Cruz
Edward G. Lyon, University of California, Santa Cruz
Eduardo Mosqueda, University of California, Santa Cruz

**Poster Session B**
4:15pm – 5:15pm, Griffin Exhibit Hall

**Strand 1: Science Learning, Understanding and Conceptual Change**
**Poster Session B**
4:15pm – 5:15pm, Griffin Exhibit Hall

**B2. Using Visualizations to Help Younger Student Understand Inheritance**
Joi Merritt, Michigan State University, jmerritt@msu.edu
Michelle Williams, Michigan State University

**B4. A Model Centric Ontology for Physics**
Eric Brewe, Florida International University, ebrewe@fiu.edu

**B6. Children Learning to Explain Astronomy across Moving Frames of Reference: Kinesthetic and Visualization Strategies**
Julia D. Plummer, Pennsylvania State University, jdp17@psu.edu
Alicia Kocareli, Arcadia University
Cynthia Slagle, Colonial School District
Jörg Großschedl, IPN, Kiel Germany
Kristina Brandstädtner, IPN, Kiel Germany; brandstaedter@ipn.uni-kiel.de
Cornelia Sommer, IPN, Kiel Germany
Ute Harms, IPN, Kiel Germany

B10. Immersive Visual Learning of Moon Phases and Seasons in a Planetarium Setting
Thomas R. Tretter, University of Louisville, tom.tretter@louisville.edu
E. Scott Ingle, University of Louisville

B12. Learners’ Strategies for Size Estimation
Cesar Delgado, The University of Texas at Austin, cesar_delgado@austin.utexas.edu
Hye Sun You, The University of Texas at Austin

B14. Student Views of Formative Assessment in High School Chemistry
Rachelle A. Haroldson, University of Minnesota, haro0032@umn.edu

B16. Using Second Life in a Formal STEM Classroom to Learn how to Represent Annotated Genomes and Develop a Sense of Community
Kari L. Clase, Purdue University, kclase@purdue.edu
Kristy L. Halverson, University of Southern Mississippi
Sandra Bohn, University of Southern Mississippi
Robin Heyden, Educational Consultant

B18. Comparing Epistemic Features of Student and Teacher Talk during Argument-based Instruction
Andri Christodoulou, King’s College London, andri.christodoulou@kcl.ac.uk
Jonathan F. Osborne, School of Education, Stanford University

B20. The Language of Science Teaching in High School Students’ Internship
Pei-Ling Hsu, University of Texas at El Paso, phsu3@utep.edu

B22. Relations between Epistemological Beliefs and Science Learning Abilities in Korean Sixth Grade Elementary School Students
Jeong Ae Won, Daejon Sunam Elementary School, jaeonwon@gmail.com
Seounghye Paik, Korea National University of Education
Jungeun Kim, Korea National University of Education
Suhui Son, Korea National University of Education

B24. Characteristics of Real Life Contexts and their Influence on Student Interest in Learning Chemistry
Helena Van Vorst, helena.vantorst@uni-due.de
Sabine Fechner
Elke Sumfleth

B26. Review of Research on Inquiry-Based Laboratory Activities in Science Education in the Last Decade
Sevgi Aydin, Yuzuncu Yil University, sevgi.aydin45@hotmail.com

B28. Elementary Human Health and Biology
Ann W. Wright, Professor of Biology Canisius College, wrighta@canisius.edu
Sue D. Tunnicliffe, Institute of Education, University of London

B30. Beyond Classrooms: Mediating Consequential Science during Dam Removal and Habitat Restoration
Timothy K. O’Mahony, University of Washington, tko2@u.washington.edu

B32. Earth Science Teachers’ Knowledge of the Water System and Its Reflections in Their Lesson Plans
Youngyeeong Nam, University of Minnesota, namxx020@umn.edu
Gillian Roehrig, University of Minnesota
Fred N. Finley, University of Minnesota

B34. Changing NOS Views of a Preservice Teacher after being Actively Involved in a Research Study
Huseyin Colak, Northeastern Illinois University, h-colak@neiu.edu
Evert Cuesta, Northeastern Illinois University

B36. Making Connections: Comparison Tasks and Analogical Mapping as a Scaffold for Argumentation
Brandon Emig, North Carolina State University, bremig@ncsu.edu
Scott P. McDonald, Pennslyvania State University
B38. Understanding the PCK and Practices of Early Career Science Teachers in Diverse Settings: A Longitudinal Multiple Case Study
Irasema B. Ortega, University of Alaska-Anchorage, iortega2@uaa.alaska.edu
Julie A. Luft, The University of Georgia

B40. Model-Based Inquiry Instruction: Promoting Knowledge Generation in Biology
Vivien M. Chabalengula, Southern Illinois University, mweene@siu.edu
Frackson Mumba, Southern Illinois University

B42. Does BEMA Actually Measure Anything? Searching for the Construct of Brief Electricity and Magnetism Assessment
Lin Ding, School of Teaching and Learning, The Ohio State University, ding.65@osu.edu
Hui Jin, The Ohio State University

B44. Mass Media as a Pedagogical Tool to Increase Awareness of Nutrition in Advertising
Penny Shumaker Jeffrey, NC State University, penny_jeffrey@ncsu.edu
Gail M. Jones, North Carolina State University

B46. Assessing the Impact of a Values Affirmation Task across Biology, Biochemistry, and Physics
Jennifer L. Momsen, North Dakota State University, Jennifer.Momsen@ndsu.edu
Erika Offerdahl, North Dakota State University
Warren Christensen, North Dakota State University
Shanda Lauer, North Dakota State University
Lisa Montplaisir, North Dakota State University
Mila Kryjevskaia, North Dakota State University

B48. Illinois Researchers in Partnership with Science Educators (iRISE): A New Model for Training Science and Engineering Graduate Students in Education and Outreach
Sharlene M. Denos, University of Illinois, Urbana-Champaign, denos@illinois.edu
Tang Wee Teo, National Institute of Education

B50. Analysis of Students’ Argumentation
Hai-Ju Huang, California State University Sacramento, hhuang@csus.edu
Y. Kirk Lin, National Taiwan University

B52. Validation of Science Motivation Questionnaires with Korean College Students
Kongju Mun, Ewha Womans University, mkj@ewha.ac.kr
Sung-Youn Choi, Ewha Womans University
Sung-Won Kim, Ewha Womans University

B54. Exploring Students’ Model Building Practices while Solving Representational Translation Tasks in Organic Chemistry
Jeffrey T. Olimpo, University of Maryland, College Park, jeolimpo@umd.edu
Bonnie L. Dixon, University of Maryland, College Park

B56. Engaging Undergraduates in the Scientific Enterprise through a Summer Research Experience
Parker E. Stuart, University of Missouri-Columbia, pes4kc@mail.missouri.edu
Stephen B. Witzig, University of Missouri-Columbia
Deanna Lankford, University of Missouri - Columbia
Christopher D. Murakami, University of Missouri-Columbia
Anna M. Waldron, University of Missouri-Columbia

B58. Holding a Science Fair on the Web: Epistemological & Ethical Considerations
G. Michael Bowen, Mount Saint Vincent University, gmbowen@yahoo.com
John L. Bencze, University of Toronto
Susan Jagger, University of Toronto

B60. Children in Science Fairs: Interviews with Parents
G. Michael Bowen, Mount Saint Vincent University, gmbowen@yahoo.com
John L. Bencze, University of Toronto
Dianne Fraser, Mount Saint Vincent University

B62. Leveraging Out of School Learning Opportunities: A Visit to the Jet Propulsion Laboratory
Athena R. Ganchorre, University of Arizona, athenag@u.arizona.edu

B64. Working on the Public’s Perception and Understanding of Science and Scientists through a Popular, Open-access ‘AskScience’ Website
Leigh S. Arino De La Rubia, Tennessee State University, leigh.arinodelarubia@gmail.com
Tobias Lundberg, Murray State University
Eric Ray, Corpus Christi Museum of Science and History
Alex Shaver, Iowa State University
Alexander Blake, University of Arizona
Bradley Biladeau, University of Idaho
Alexander Klotz, McGill University
Andreas Lundberg,

B66. Talking About Science: The Discursive Experiences of Science Center Staff
Andrea M. Motto, Virginia Tech, ammotto@vt.edu
Strand 7: Pre-service Science Teacher Education
Poster Session B
4:15pm – 5:15pm, Griffin Exhibit Hall

B68. Breaking Tradition: The Impact of Community Based Learning Courses on Teacher Preparation
Eunmi O. Yang, Stonehill College, emyangk@hotmail.com
Briana K. Burke, Stonehill College

B70. Differences between Intensified, Non-Intensified, and Non-Educational Student Teachers’ Professional Knowledge in Chemistry
Stefan Mutke, University of Duisburg-Essen, Germany, stefan.mutke@uni-due.de
Oliver Tepner, University of Duisburg-Essen, Germany

B72. Simulated Interaction Model (SIM): An Innovative Approach for Preparing and Researching Preservice Science Teachers
Jeffrey J. Rozelle, Syracuse University, jrozelle@syr.edu
Benjamin H. Dotger, Syracuse University
Sharon Dotger, Syracuse University
Joanna O. Masingila, Syracuse University

B74. Implementing a Residency-model for Science Teacher Preparation
Nanette I. Dietrich, Millersville University, ndietrich@millersville.edu
Oliver Dreon, Millersville University

B76. Multidisciplinary Methods: Inquiry into Science and Art
Michelle A. Fleming, University of Wisconsin Oshkosh, flemingm@uwosh.edu

B78. Pre-service Teachers Perceptions of Rural and Urban Students and Schools
Helen M. Meyer, University of Cincinnati, helen.meyer@uc.edu
Anna E. Hutchinson, University of Cincinnati

B80. Prospective Elementary Teachers’ Reflections on Learning-To-Teach Science Experiences
Lucy Avraamidou, University of Nicosia, avraamidoul@unic.ac.cy

Strand 8: In-service Science Teacher Education
Poster Session B
4:15pm – 5:15pm, Griffin Exhibit Hall

B82. An Examination of Beginning Science Teacher Identity Constructions through an Online Mentoring Program: A Two-Year Qualitative Study
EunJin Bang, Iowa State University, ejbang@iastate.edu
Julie A. Luft, The University of Georgia

B84. Characterizing District-wide Teachers’ Science Learning Networks: Silos and Barriers to Change and Innovation
Fouad Abd-El-Khalick, University of Illinois at Urbana-Champaign,
fouad@illinois.edu
Caroline Haythornthwaite, University of British Columbia
Kirstin Phelps, University of Illinois at Urbana-Champaign
Anita M. Martin, University of Illinois at Urbana-Champaign

B86. Physics Teachers’ Collective Agency: A Case in Curriculum Reform
Guopeng Fu, University of British Columbia, fgpubc@interchange.ubc.ca
Samson Madera Nashon, University of British Columbia

B88. Committed to Teaching: Beliefs of Persisting Beginning Secondary Science Teachers
Sissy S. Wong, University of Houston, sssywong@uh.edu
Inserena B. Ortega, University of Alaska Anchorage
Jonah B. Firestone, Arizona State University
Julie A. Luft, The University of Georgia

B90. Exploring Teachers’ Epistemological Belief in Relation to Their Practice and Students’ Critical Thinking Skills
Niphon Chanlen, University of Iowa, niphon-chanlen@uiowa.edu

B92. Assessing Changes in Understandings of Scientific Inquiry and Teaching Across Three Research Experiences for Teachers
Sanlyn R. Buxner, University of Arizona, buxner@email.arizona.edu

Strand 9: Reflective Practice
Poster Session B
4:15pm – 5:15pm, Griffin Exhibit Hall

B94. A Three Part Reflective Exercise for Generating Concept Specific Instructional Ideas
Daniel Z. Meyer, Illinois Institute of Technology, meyerd@iit.edu

B96. Confronting Myths of the Science Teacher Educator: Becoming a “Facilitator” Instead of “Expert”
Nicole Beeman-Cachwallader, Indiana University, nbeeman@iurmail.iu.edu
Gayle A. Buck, Indiana University
Amy Trauth-Nare, Indiana University
Strand 10: Curriculum, Evaluation, and Assessment
Poster Session B
4:15pm – 5:15pm, Griffin Exhibit Hall

B98. The Inclusion of Key Nature of Science Concepts in Saudi 10th Grade Biology Textbooks
Ibrahim M. Alasmari, King Saud University, Saudi Arabia,ibr411@hotmail.com
Fahad S. Alshaya, King Saud University, Saudi Arabia
Saeed M. Alshamrani, King Saud University, Saudi Arabia

B100. The Psychometric Properties of the Refined Materials Concept Inventory (MCI)
James Corkins, Mesa Community College and Arizona State University,james.corkins@gmail.com

B102. Science and Social Exclusion: Exploring the Promise of Pedagogy
Anastasios Siatras, School of Education, Aristotle University of Thessaloniki, Greece, asiatras@auth.gr

B104. Middle-schoolers’ Science Learning Measured by Close and Proximal Assessments Based on the Framework for K-12 Science Education: Implications for Standards-based Accountability and Teacher Performance Evaluations
Kathryn F. Drago, University of Michigan, kdrago@umich.edu

B106. Evaluating the Assessment of Student Learning related to Novel Instructional Materials
Georgia W. Hodges, The University of Georgia, georgia.hodges@gmail.com
J. Steve Oliver, The University of Georgia
Kyung-a Kwon, The University of Georgia
Al Cohen, The University of Georgia
B.J. Wimpey, The University of Georgia
Tom Robertson, The University of Georgia
Jim Moore, The University of Georgia
Jared Jackson, The University of Georgia

B108. Development of the Critical Engineering Literacy Test (CELT)
Senay Purzer, Purdue University, spurzer@purdue.edu
Michael Fosmire, Purdue University
Ruth E.H. Wertz, Purdue University
So Yoon Yoon, Purdue University

B110. Alignment between Standards and Alternative Assessment Based TIMSS-07 Questions: A Comparison among California State (US), Turkey, and Singapore
Yılmaz Kara, Karadeniz Technical University, karayilmaz@hotmail.com
Salih Cepini, Karadeniz Technical University

Strand 11: Cultural, Social, and Gender Issues
Poster Session B
4:15pm – 5:15pm, Griffin Exhibit Hall

B112. Children of Elite Advocating for Disadvantaged Others: Factors Influencing their Actions on Socioscientific Issues
John L. Bencze, OISE, University of Toronto, larry.bencze@utoronto.ca
Nathalie Lemelin, Lower Canada College, Montreal

B114. Sociocultural Predictors of Girls’ Intention to Pursue STEM Careers
Theresa A. Cullen, University of Oklahoma,tacullen@ou.edu
H. Michael Crowson, University of Oklahoma

B116. Journeys of Black Scholars in the Academy: Re-Imaging Research and Teaching
Mary M. Atwater, University of Georgia, atwater@uga.edu
Tonjua B. Freeman, University of Georgia
Malcolm B. Butler, University of South Florida
Eileen C. Parsons, University of North Carolina-Chapel Hill

B118. Enhancing Urban Students’ Theories of Intelligence as Part of Positive Identity Development
Obed Norman, Howard University, onorman6@gmail.com
Sylvester McKay, Morgan State University
Avis D. Jackson, Morgan State University
Mercy Wangu Ndege, Morgan State University
Samantha L. Strachan, Morgan State University
Nicola Norman, Morgan State University

B120. The Roles of Epistemology and Positionality in Teaching Assistants’ Development of Inquiry Teaching Practices
Cara L. Gormally, Georgia Tech, cara.gormally@biology.gatech.edu
Angela Johnson, St. Mary’s College of Maryland
Jaweer Brown, EngenderHealth

B122. Fukushima Disaster: Online Debate and its Implication in Socio-Scientific Argumentation
Bahadir Namdar, University of Georgia, baha@uga.edu
Ji Shen, University of Georgia

B124. Single-sex Physics Instruction: One Way to Foster Girls’ and Boys’ Interest?
Knut Neumann, Leibniz Institute for Science Education (IPN) Kiel, neumann@ipn.uni-kiel.de
Andreas Borowski, University Duisburg-Essen
Trand 12: Educational Technology
Poster Session B
4:15pm – 5:15pm, Griffin Exhibit Hall

B126. Designing an Effective Science Education Computer Game through the Light of Commercial Computer Game Design Principles
Elif Ozturk, Texas A&M University, elifo@tamu.edu
Gokhan Ozturk, Texas A&M University

B128. Relating Student Actions to Learning Gains: Using Immersive Virtual Worlds to Support Understanding of Ecological Systems
Amy M. Kamarainen, University of Wisconsin, amkamarainen@gmail.com
Shari Jackson Metcalf, Harvard University
Shane Tutwiler, Harvard University
Tina Grotzer, Harvard University
Chris Dede, Harvard University

B130. Investigating Students’ Patterns of Use of Supports in an Electronic Science Inquiry Unit
Kasey McCall, University of Michigan, kaseyl@umich.edu
LeeAnn M. Sutherland, University of Michigan
Namsoo Shin, University of Michigan

B132. Exploring Student-created Animations to Show Level of Understanding on the Nature of Matter Learning Progression
Jennifer L. Albert, NC State University, jennifer_albert@ncsu.edu
Margaret R. Blanchard, North Carolina State University
Eric N. Wiebe, North Carolina State University

B134. Teachers’ Implementation of a Game-Based Biotechnology Curriculum
Jennifer L. Eastwood, Oakland University, eastwood@oakland.edu
Troy D. Sadler, University of Missouri

B140. Consistency of Practical and Formal Epistemologies of Science Held by Participants of a Research Apprenticeship
Stephen R. Burgin, University of Florida, sburgin@ufl.edu
Troy D. Sadler, University of Missouri

B142. Science Teacher Practice and the Development of Student Scientific Creativity
Allison Antink Meyer, Illinois Institute of Technology, aantink@hawk.iit.edu
Norman G. Lederman, Illinois Institute of Technology

Strand 14: Environmental Education
Poster Session B
4:15pm – 5:15pm, Griffin Exhibit Hall

B146. A Climate Change Education Partnership’s Efforts to Research and Improve Coastal Regions Climate Change Education
Benjamin C. Herman, University of South Florida, bcherman@usf.edu
Allan Feldman, University of South Florida
Vanessa Vernaza-Hernández, University of South Florida
Larry Plank, Hillsborough County Public Schools

B148. Urban Students’ Perceptions of Scientists, Stewards, & the Environment
Stephanie Hathcock, Old Dominion University, shath005@odu.edu
Daniel L. Dickerson, Old Dominion University

B150. Are Middle Level Students able to Name an Organism when Provided with Characteristics and Habitat?
Patricia Patrick, Texas Tech University, trish.patrick@ttu.edu

Strand 15: Policy
Poster Session B
4:15pm – 5:15pm, Griffin Exhibit Hall

B152. Policy Implications of Teacher STEM Grant Proposals
Mary W. Stroud, University of Cincinnati, stroudmw@mail.uc.edu
Maya Israel, University of Cincinnati
Helen M. Meyer, University of Cincinnati
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, Room 101

Presiders:
Jomo Mutegi, Indiana University - Purdue University Indianapolis, jmutegi@iupui.edu
Kathryn F. Drago, University of Michigan
Eileen C. Parsons, The University of North Carolina

JRST Editorial Board Meeting/Reception
Meeting open/Reception by invitation
6:30pm – 8:30pm, Rooms 201 and 202

NARST Environmental Education Gathering and Dinner.
Meet in lobby at 6:30pm, dinner at 7:00pm.

Graduate Student and Early Career Scholars Informal Social
7:00pm – 8:00pm, Room
TGI Friday’s
501 W. Washington Street
(accessible through the hotel parking lot)
7:00am - 10:00am

Conference Registration
7:00am – 5:00pm, White River Registration

Committee Meetings
7:00am – 8:15am

Awards Committee Chairs & Co-Chairs Meeting
7:00am – 8:15am, Room 301

Equity and Ethics Committee Meeting
7:00am – 8:15am, Room 302

External Policy and Relations Committee Meeting
7:00am – 8:15am, Room 303

Research Committee Meeting
7:00am – 8:15am, Room 304

Membership and Election Committee Meeting
7:00am – 8:15am, Room 305

International Committee Meeting
7:00am – 8:15am, Room 306

Program Committee Meeting
7:00am – 8:15am, Room 308

Publications Advisory Committee Meeting
7:00am – 8:15am, Room 309

Concurrent Session #7
8:30am – 10:00am

Program Committee Sponsored Session
Virtual Presentations with Scholars in Nigeria, Ethiopia and South Africa: Focus on Strands 11 and 12
8:30am – 10:00am, Room 105

Presiders:
Sharon Lynch, George Washington University
Anita Welch, North Dakota State University

Background: During the 2011 NARST International Annual Conference, the Program Committee proposed to offer a small number of virtual presentations during 2012 Conference aimed at NARST scholars living in developing countries. Scholars whose proposals were accepted will present their work from remote sites.

The rationale for this experiment was that attending a NARST Conference could be prohibitive for many such scholars for reasons such as travel restrictions and cost. The International Committee provided a definition of countries that would qualify for the session (according to a UNDP definition of .700 and below).

This session will feature three virtual presentations given by scholars from three countries in Africa who submitted acceptable proposals. The virtual presentations will be conducted using SKYPE, allowing interactivity with audience and presenters, along with a second screen for their PowerPoint presentations. As this is a pilot study, we hope that technologies involved are all up to the challenge, as are the presenters, presiders, and audience. After the session, all participants will be able to provide feedback on the technological aspects of the session and the potential having a virtual component of the NARST Annual International Conference in the future.

Multiple Intelligences Profile of Nigerian Science Students: Implications for Teaching and Learning
Immaculata Egerue, Lagos State University, Nigeria, pokebukola@gmail.com
Peter Okebukola, Lagos State University, Nigeria
Tunde Owolabi, Lagos State University, Nigeria

Effects of Computer Simulations on Undergraduate Science Students Physics Achievement
Aklilu Tilahun Tadesse, Arba Minch University, Ethiopia, aklilu_tt@yahoo.com
Bereket Gebre, Arba Minch University, Ethiopia
Melak Mesfin Ayenaw, Arba Minch University, Ethiopia
Tesfay Medhin Teamir, Arba Minch University, Ethiopia

Talking Science in the Mother Tongue: Possibilities and Challenges for Substantive Learner Engagement
Audrey Msimanga, University of the Witwatersrand, Johannesburg, South Africa

Strand 1: Science Learning, Understanding and Conceptual Change
Strand Sponsored Session - How Best Can Multiple External Representations be Harnessed for Improving Learning in Biology?
8:30am – 10:00am, Room 310

Presider:
David F. Treagust, Curtin University, Australia

Presenters:
Chi-Yan Tsui, Curtin University, Australia
Anat Yarden, Weizmann Institute of Science, Israel
Phyllis Griffard, Weill Cornell Medical College in Qatar, Qatar
Kristy L. Halverson, University of Southern Mississippi, USA
Konrad Shoeborn, Linköping University, Sweden
Renee S. Schwartz, Western Michigan University, USA
Siu Ling Wong, University of Hong Kong, Hong Kong
Barbara C. Buckley, WestEd, USA
Kai Niebert, Leibniz University Hannover, Germany
Strand 2: Science Learning: Contexts, Characteristics and Interactions

Related Paper Set - Understanding the Role of Context and Activity in Students’ Argumentation Practice
8:30am – 10:00am, Room 302

**Presider:**
Leema Berland, University of Texas, Austin

Variation in how Individuals Argue about Scientific and Socioscientific Questions
Sarah Rogers, University of Texas, Austin, sarahjaner@utexas.edu
Kirstin C. Busch, University of Texas, Austin
Leema Berland, University of Texas, Austin

Learning to Argue and Arguing to Learn: A Longitudinal Study of the Impact of Argument-based Instruction on Undergraduate Chemistry Students’ Written Arguments
Jos P. Walker, Florida State University, walkerj@tcc.fl.edu
Victor D. Sampson, Florida State University

Engaging Students in Developing the Means of Knowing through Argument
Eve I. Manz, Vanderbilt University, eve.i.manz@vanderbilt.edu

Coordination of Discursive Practice and Material Resources: Leveraging Students to Engage in Epistemic Discussions
Suna Ryu, UCLA, suaryu@ucla.edu
William A. Sandoval, University of California, Los Angeles

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

Building Scientific Explanations
8:30am – 10:00am, Room 301

**Presider:**
Felicia M. Mensah, Teachers College, Columbia University

Supporting Elementary Students in Making and Recording Scientific Observations
Anna Maria Arias, University of Michigan, aarias@umich.edu
Elizabeth A. Davis, University of Michigan
Annemarie S. Palincsar, University of Michigan

The Establishment of Whole-class Dialogue Patterns by one Experienced Teacher using Argument-based Inquiry (ABI)
Matthew J. Benus, Indiana University Northwest, mbenus@ian.edu

Strand 4: Science Teaching--Middle School (Grades 7-12)

Enhancing Scientific Literacy
8:30am – 10:00am, Room 304

**Presider:**
Eva Erdosne Toth, West Virginia University

Fostering Scientific Literacy in Bioengineering Hybrid Courses
Yehudit Judy Dori, Israel Institute of Technology, yjdori@technion.ac.il
Hagit Yarden, Technion, Israel Institute of Technology
Amira Allouche, Technion, Israel Institute of Technology

The Effect of Plain-English Instruction on Student Achievement and Classroom Culture in College Science Vocabulary
Emily G. Schoerning, emily-richter@uiowa.edu

Impact of Social Media as an Instructional Component on Content Knowledge, Attitudes, and Public Engagement Related to Global Climate Change
Sallie E. Greenberg, University of Illinois at Urbana-Champaign, greenberg@isgs.illinois.edu
Fouad Abd-El-Khalick, University of Illinois at Urbana-Champaign

Rhetorical Moves as a Basis for Teaching Undergraduate Life Science Students to read Primary Literature
Miriam A. Ossevoort, University of Groningen, The Netherlands, m.a.ossevoort@rug.nl
Edwin B. Van Lacum, University of Groningen, The Netherlands
Martin J. Goodhart, University of Groningen, The Netherlands
Strand 6: Science Learning in Informal Contexts
Developing Interests and Identities towards Science Outside of School
8:30am – 10:00am, Room 305

President:
Kathleen A. Fadigan, Pennsylvania State University

Identity Development of Middle School Students as Learners of Science during Learning Conversations at an Informal Science Education Camp
Kelly A. Riedinger, University of North Carolina Wilmington, riedingerk@uncw.edu

The Influence of Science Summer Camps on STEM Career Interest among Sixth-Eighth Graders
Xiaoqing Kong, University of Virginia, xk4wa@virginia.edu
Robert H. Tai, University of Virginia

The Impact of Summer Research-Based Program on Students’ Attitudes and Interests in STEM
Natalie A. Tran, California State University, Fullerton, natran@fullerton.edu
Andreas Gebauer, California State University, Bakersfield
Palma Hernandez, California State University, Bakersfield
Mark Vizcarra, California State University, Bakersfield

The Effect Out-of-School-Time Programs on Career Choices in STEM
Jaimie L. Miller-Friedmann, Harvard University, jlmiller@cfa.harvard.edu
Gerhard Sonnert, Harvard University
Katherine P. Dabney, University of Virginia
Philip M. Sadler, Harvard University

Strand 7: Pre-service Science Teacher Education
Topic Specific Content Knowledge and Laboratory Experiences
8:30am – 10:00am, Room 309

President:
Marissa S. Rollnick, Wits University

An Exploration of Preservice Science Teachers’ Written Argumentation in Science Laboratory Work
Dilek Karisan, yuzuncu yil university, dilekkarisan@gmail.com
Mustafa S. Töpce, yuzuncu yil university

Development of Pre-service Science Teachers’ Metacognition in an Inquiry Based Laboratory Course
Birgul Çakır, Agri Ibrahim Ceren University, birgulmetu@gmail.com
Hamide Ertepınar, Middle East Technical University
Ozgul Yılmaz-Tuzun, Middle East Technical University

A Study of Secondary Science Student Teachers’ Conceptions of Heat Transfer
Karthikeyan Subramaniam, University of North Texas, Karthikeyan.Subramaniam@unt.edu
David Wojnowski, University of North Texas
Pamela Harrell, University of North Texas

Strand 8: In-service Science Teacher Education
Various Representations of Science in the Classroom
8:30am – 10:00am, Room 313

President:
Wayne Breslyn, University of Maryland

Critical Analysis of a Science-IKS Classroom Discourse Relative to the Production of an African Staple Food
Simasiku C. Siseho, University of the Western Cape, simasiku.siseho@gmail.com
Meshach B. Ogwuiyi, University of the Western Cape

A Case-to-case Synthesis of a Longitudinal Project Exploring Language Strategies in Middle School Science
Christine D. Tippett, christine@shaw.ca
Larry D. Yore, University of Victoria

Beginning Secondary Science Teachers and Their Use of Technology in the Classroom During Their First Two Years
EunJin Bang, Iowa State University, ebang@iastate.edu
Julie A. Luft, The University of Georgia
Empowering Teachers through a Professional Learning Program that Focused on a Representation Intensive Pedagogical Approach
Gail D. Chittleborough, Deakin University, gail.chittleborough@deakin.edu.au
Peter Hubber, Deakin University

Strand 8: In-service Science Teacher Education
Teacher Conceptions of Physical and Earth and Space Science
8:30am – 10:00am, Room 106
**Presider:** Manuela Welzel-Breuer, University of Education Heidelberg

Where is Earth Science? Mining for Opportunities in Biology, Chemistry and Physics
Julie Thomas, Oklahoma State University, julie.thomas@okstate.edu
Toni Ivey, Oklahoma State University

Petrified Wood’s Effectiveness as an Interdisciplinary Science Portal: A Research Investigation with In-service Teachers
Renee M. Clary, Mississippi State University, rclary@geosci.msstate.edu
James H. Wandersee, Louisiana State University

The Development of Experienced 9th-Grade Physics Teachers’ Knowledge for Using Representations to Teach Energy
Andrew B. West, University of Missouri, westab@missouri.edu
Mark J. Volkmann, University of Missouri

Effects of an Astronomy Science Summer Camp on Astronomy Content Knowledge of In-service Physics, Science and Elementary Teachers
Sezen Apaydin, Canakkale Onsekiz Mart University, apaydinezen@gmail.com
Ayhan Karaman, Canakkale Onsekiz Mart University

Strand 10: Curriculum, Evaluation, and Assessment
Item and Instrumentation Studies
8:30am – 10:00am, Room 308
**Presider:** Ann W. Wright, Canisius College

Using Rasch Theory to Establish Construct-related Evidence for an Educational Assessment—Brief Electricity and Magnetism Assessment
Lin Ding, The Ohio State University, ding.65@osu.edu

Chemistry Concept Inventory: Is it Appropriate for Summative Assessment?
Ling L. Liang, La Salle University, liang@lasalle.edu
Xufeng Liu, State University of New York at Buffalo (SUNY)
Mihwa Park, State University of New York at Buffalo (SUNY)

Strand 11: Cultural, Social, and Gender Issues
Globalization and Neoliberal Ideology: Implications for Science Education
8:30am – 10:00am, Room 107
**Presider:** Matthew Weinstein, UW Tacoma Education Program

Western teachers of Science/Teachers of Western Science: Perceptions of the Western Science Teacher Abroad
Lydia E. Carol-Ann Burke, OISE, University of Toronto, carolann.burke@utoronto.ca

Global Capitalism and Neoliberal Ideology in Science Education: Towards Fundamental Change
Jesse T. Bazzul, University of Toronto/OISE, jesse.bazzul@utoronto.ca
John L. Bencze, Ontario Institute for Studies in Education/University of Toronto

Examining Power and Accountability Issues in a U.S. STEM School
Tang Wee Teo, National Institute of Education (Singapore), teotangwee@gmail.com

Science, Science Education and the Politics of Neoliberal Exceptionality
Matthew Weinstein, University of Washington-Tacoma, mattheww@u.washington.edu

Strand 12: Educational Technology
Modeling and Model-Based Reasoning through Technology
8:30am – 10:00am, Room 101
**Presider:** Sandra T. Martell, University of Wisconsin-Milwaukee

Enhancing Engineering Education through Hands-On Models and Computer-Based Simulations
Amy R. Pallant, The Concord Consortium, apallant@concord.org
Rachel E. Kay, The Concord Consortium
Charles Xie, The Concord Consortium
A Study on Enhancing the Thought Experiment in Modeling-based Science Teaching to Improve the Learning Effect
Jen-Chin Lin, jclin@nknucc.nknu.edu.tw

Evaluation of an Ecological Niche Modeling Tool for Climate Change Education
Vanessa L. Peters, University of Michigan, vlpeters@umich.edu
Nancy B. Songer, The University of Michigan

Strand 13: History, Philosophy, and Sociology of Science
Symposium - How can Science Educators Improve Evolution Education in America and the World?
8:30am – 10:00am, Room 102

Presider:
Leonard Bloch, University of Georgia

Presenters:
Charles Allen, Grace Unlimited Butler University Indiana University- Purdue Warren D. Allmon, Cornell University Barbara A. Crawford, University of Georgia Jeremy Peacock, Monroe Area High School Mike U. Smith, Mercer University

Strand 14: Environmental Education
Environmental Education in Practice
8:30am – 10:00am, Room 103

Field-based Geoscience Education for Students with Physical Disabilities
Christopher Atchison, Georgia State University, catchison@gsu.edu

A Longitudinal Study of Environmental and Outdoor Education: A Cultural Change
Tali Tal, Technion, rtal@cc.technion.ac.il
Orly Morag, Technion

Environmental Science Education in K-12 School Programs: Recent Research
Elizabeth Hufnagel, The Pennsylvania State University, exh5064@psu.edu
William S. Carlsen, The Pennsylvania State University
Gregory J. Kelly, The Pennsylvania State University

Student Science Achievement and the Integration of Indigenous Knowledge in the Classroom and on Standardized Tests
Juliann Benson, University of New Hampshire, juliann.benson@wildcats.unh.edu
Eleanor D. Abrams, University of New Hampshire

Co-Sponsored Session by Strand 14: Environmental Education and Strand 15: Policy
Science Education and Climate Change: Policy in K-12 Education in Diverse Global Contexts
8:30am – 10:00am, Room 303

Presider:
Sarah J. Carrier, North Carolina State University

Presenters:
Charles W. Anderson, Michigan State University
J. Randy McGinnis, University of Maryland
Teddie Phillipson Mower, University of Louisville
Elly Walsh, University of Washington
Chris McDonald, University of Maryland

Strand 15: Policy
Globalization of Science Reforms
8:30am – 10:00am, Room 104

Presider:
Gavin W. Fulmer, National Science Foundation

Consequences of the Globalization of Science Testing: A European Case Study
Jens Dolin, University of Copenhagen, dolin@ind.ku.dk
Robert H. Evans, University of Copenhagen
Lars B. Krogh, Aarhus University

There’s More to Science than Recall: An Analysis
Anna MacPherson, Stanford University, annamac@stanford.edu
Jonathan F. Osborne, Stanford University

A Country Specific Insights into the Impact of International Comparative Studies on Educational Reforms
Imbi Henno, Tallinn University, imbi.henno@tlu.ee
Priit Reiska, Tallinn University

Science Curriculum Policy-making in Ontario: Global Influences, Localized Political and Economic Landscapes and Curriculum Reform
Marietta Bloch, Roehampton University, mars_bloch@edu.yorku.ca

Break
10:00am – 10:30am, Foyer – White River Ballroom
Plenary Session #2
Student Diversity and Science Education Research in a Global Context: Research Agenda and the Role of NARST
10:00am – 12:00pm, White River Ballroom A – E
Introducer:
J. Randy McGinnis, NARST President, University of Maryland
Presider:
Sharon Lynch, NARST President-Elect, George Washington University
Keynote Presenter:
Okhee Lee, New York University

Awards Luncheon
12:00pm – 2:00pm, White River Ballroom F – J

Concurrent Session #8
2:15pm – 3:45pm

International Sponsored Session
Symposium - Linking Science Educators Program in Rwanda: Supporting Learner-Centered Approaches in Rwandan Science Classrooms
2:15pm – 3:45pm, Room 313
Presider:
Sibel Erduran, University of Bristol
Presenters:
Sibel Erduran, University of Bristol, sibel.erduran@bristol.ac.uk
Paul Denley, University of Bath, UK
Alphonse Uworwabayebo, Kigali Institute of Education, Rwanda
Mengesha Ayene, Bahir Dar University, Ethiopia

Strand 1: Science Learning, Understanding and Conceptual Change
Related Paper Set - Learning about Ecosystems: Conceptualizing and Designing Learning Environments
2:15pm – 3:45pm, Room 310

Causal Tensions in Reasoning about Ecosystems Dynamics: A Theoretical Analysis of Supportive Instructional Contexts
Tina Grotzer, Harvard University, Tina_Grotzer@pz.harvard.edu
Shane Turwiler, Harvard University

Fostering and Assessing Model-Based Learning with SimScientists Ecosystems
Barbara C. Buckley, WestEd, bbuckle@wested.org
Edys Quellmalz, WestEd
Matthew Silberglitt, WestEd

Structure, Behavior, and Function: A Lens for Observing Complex Ecosystem Relations
Cindy E. Hmelo-Silver, Rutgers University, cindy.hmelo-silver@gse.rutgers.edu
Catherine Eberbach, Rutgers University
Rebecca Jordan, Rutgers University
Ashok Goel, Georgia Institute of Technology

Engaging Students in Modeling to Develop Understanding of Ecosystems
Michelle Cotterman, Vanderbilt University, michelle.cotterman@vanderbilt.edu
Eve I. Manz, Vanderbilt University
Richard Lehrer, Vanderbilt University
Leona Schauble, Vanderbilt University/Peabody College
Deborah Lucas, Vanderbilt University/Peabody College
Mayumi Shinohara, Vanderbilt University/Peabody College

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Attitudes and Identities
2:15pm – 3:45pm, Room 302
Presider:
Lynn D. Dierking, Oregon State University

Are Undergraduates’ Attitudes toward Science Affected by Epistemological Beliefs?
Gavin W. Fulmer, National Science Foundation, gfulmer@nsf.gov

Place and the Structuring of Science Identities in a Science Center
Jennifer D. Adams, Brooklyn College, jdadams215@gmail.com
Preeti Gupta, New York Hall of Science

An Ethnographic Analysis of How Students’ Perceived Identities Shape Science Classroom Discourse
Minjung Ryu, University of Maryland, College Park, mryu@umd.edu
Tiffany-Rose Silorski, University of Maryland, College Park

Development and Validation of an Instrument to Assess Precollege Arabic Speaking Students’ Attitudes toward Science
Ryan Summers, University of Illinois at Urbana-Champaign, summers4@illinois.edu
Fouad Abd-El-Khalick, University of Illinois at Urbana-Champaign
Ziad Said, College of the North Atlantic
Heather Freissen, College of the North Atlantic
Michael Culbertson, University of Illinois at Urbana-Champaign
Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies
Elementary Science Teacher Education
2:15pm – 3:45pm, Room 301
**Presider:**
Carolyn S. Wallace, Indiana State University

Fostering Teachers’ Curricular Knowledge and Curriculum Design Capabilities About Modeling-Centered Scientific Inquiry
Marios Papaevripidou, University of Cyprus, mpapa@ucy.ac.cy
C. P. Constantinos, University of Cyprus
Zacharias C. Zacharias, University of Cyprus

Preservice Elementary Teachers’ and Mentors’ Evidence Based Reflection Using a Web-Based Video Analysis Tool (VAT)
Eulsun Seung, Indiana State University, esseung@gmail.com
Soonhye Park, University of Iowa

Elementary Teachers’ Enactment of Science Curriculum Materials: Investigating Early Learners’ Engagement in Scientific Practices
Cory T. Forbes, University of Iowa, cory-forbes@uiowa.edu
Mandy Biggers, University of Iowa
Laura Zangori, University of Iowa

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies
Assessment and Review Strategies
2:15pm – 3:45pm, Room 303
**Presider:**
J. Steve Oliver, The University of Georgia

Analyzing Biology Teachers’ Pedagogical Content Knowledge and Content Knowledge by Using a Paper and Pencil Test
Melanie Jüttner, Biology Education, University of Munich, melanie.juettner@lrz.uni-muenchen.de
Birgit Jana Neuhaus, Biology Education, University of Munich

Developing an Instrument to Examine the Relationship between Pedagogical Content Knowledge and Science Teaching Orientations
Syh-Jong Jang, Chung-Yuan Christian University, jang@cyu.edu.tw

Exploring the Potentials and Challenges of Integrating Formative Assessment in Examination-Oriented Science Classrooms
Xinying Yin, Indiana University, yinx@indiana.edu
Gayle A. Buck, Indiana University

Facet-based Assessment of Teacher Knowledge and Skills of Formative Assessment
Jim Minstrell, FACET Innovations, JimMinstrell@FACETInnovations.com
Min Li, University of Washington
Ruth A. Anderson, FACET Innovations, LLC

Strand 5: College Science Teaching and Learning (Grades 13-20)
The Impact of Research Experiences
2:15pm – 3:45pm, Room 304
**Presider:**
Ann W. Wright, Canisius College

Learning to do Research in a Research Experience for Undergraduates (REU) Program
Allan Feldman, University of South Florida, afeldman@usf.edu
Dilek Ozalp, University of South University

How do Summer Undergraduate Research Experiences Compare to Other Models?
Omolola A. Adedokun, Purdue University, oadedok@purdue.edu
Ann Bessenbacher, Purdue University
Loran Carleton Parker, Purdue University
Amy C. Childress, Purdue University
Lisa P. Kirkham, Purdue University
Dorothy Teegarden, Purdue University
Wilella D. Burgess, Purdue University

A Longitudinal Study of how Graduate Students in Field Ecology Acquire Research Expertise
Mika Leon-Beck, The Hebrew University of Jerusalem, Israel, mikabeck@gmail.com
Jeff Dodick, The Hebrew University of Jerusalem, Israel

The Impact of a Summer Research Program on Rising College Freshmen’s Integration Into a Science Community of Practice
Grant E. Gardner, East Carolina University, gardnerg@ecu.edu
Jennifer H. Forrester, The University of Wyoming
Penny Shumaker Jeffrey, North Carolina State University
Strand 5: College Science Teaching and Learning (Grades 13-20)
Symposium - Undergraduate Science Assessment: Current Innovations and Future Obstacles and Opportunities
2:15pm – 3:45pm, Room 309
Presider: Marcelle A. Siegel, University of Missouri-Columbia
Presenters: Janet Coffey, Gordon & Betty Moore Foundation University of Maryland, College Park
Sandra K. Enger, The University of Alabama in Huntsville
Ellen Osmundson, CRESST, The University of California-Los Angeles
Sarah B. Woodruff, Ohio's Evaluation and Assessment Center for Mathematics and Science Education
Jerome M. Shaw, University of California - Santa Cruz
Dennis W. Sunal, The University of Alabama
Robert E. Yager, The University of Iowa
Marcelle A. Siegel, University of Missouri-Columbia
Jennifer Clasegens, Northern Arizona University
Michelle Sinapuelas, University of California-Berkley

Strand 6: Science Learning in Informal Contexts
Families Encouraging Science Learning and Participation
2:15pm – 3:45pm, Room 305
Presider: Janell Nicole Catlin, Teachers College, Columbia University
An Exploratory Study of Parent Involvement by Take-Home Science Activities in Taiwan
Yi-Ting Cheng, Nation Chenchua University of Education, tonia0213@yahoo.com.tw
Huey-Por Chang, National Chenchua University of Education
Family Meaning-Making and Identity Negotiation at Telescope Observing Events
Matthew Wenger, University of Arizona, Tucson, mwenger@email.arizona.edu

The Association of Parental Hobbies and Male Physicists’ Interest in Science
Devasmita Chakraverty, University of Virginia, dc5na@virginia.edu
Robert H. Tai, University of Virginia

Documenting Family Interactions at Touch Tanks: Is the Talk More Important than the Touch?
Shawn Rowe, Oregon State University, shawn.rowe@oregonstate.edu
James F. Kissel, California State University, Long Beach

Strand 7: Pre-service Science Teacher Education
Pre-service Teacher Beliefs and Efficacy
2:15pm – 3:45pm, Room 306
Presider: Sherry S. Herron, University of Southern Mississippi
An Exploration of the Relationship between Preservice Teachers’ Teacher Efficacy Beliefs and Constructivist-based Teaching Practice
Tugba Temiz, Yuzuncu Yil University, tugbaaaygani@yahoo.com
Mustafa S. Topcu, Mugla University
Impact of a Content Area Practicum Experience on Pre-Service Science Teacher Content and Pedagogical Efficacy
Timothy A. Goodale, College of Coastal Georgia, tgoodale@ccga.edu
Understanding Preservice Teacher Belief Systems with the Use of a Complex Systems Model
Brian S. Fortney, The University of Texas at Austin, bfortney@austin.utexas.edu

Strand 8: In-service Science Teacher Education
Mentoring and the Induction Years
2:15pm – 3:45pm, Room 105
Presider: Martina Nieswandt, University of Massachusetts, Amherst
Qualitative Indicators of Successful Induction: Case Studies of Four Beginning Secondary Science Teachers’ Meaning Making and Identities-in-Practice
Angela W. Webb, Louisiana State University, awwebb@lsu.edu
Mentoring Science and Mathematics Teachers Using the Plus/Delta: Assessing an Induction Experience
Sheryl L. Meglamer, University of Nebraska at Omaha, smeglamer@unomaha.edu
Saundra L. Shillingstad, University of Nebraska at Omaha
Teacher-to-Teacher Mentoring: A Model for Meaningful Professional Development that Facilitates Teacher Change
Jason Petula, Penn State Harrisburg, jason.petula@psu.edu
Beginning Secondary Science Teachers’ Beliefs, Practices, and Experiences: A Five-Year Mixed Methods Study
Julie A. Luft, The University of Georgia, jaluft@uga.edu
Jonah B. Firestone, Arizona State University
Charles B. Weeks, Arizona State University
Sissy S. Wong, University of Houston
Krista Adams, University of Nebraska
Irasema B. Ortega, University of Alaska

Strand 8: In-service Science Teacher Education Curriculum as a Basis for Professional Development
2:15pm – 3:45pm, Room 106
Presider:
Eva Erdosne Toth, West Virginia University

In-service Teachers’ Attitudes and Beliefs about Climate Change
Shiyu Liu, University of Minnesota, liux0631@umn.edu
Jeremy Wang, University of Minnesota
Keisha Varma, University of Minnesota
Gillian Roehrig, University of Minnesota

The Effect of Curriculum-based Professional Development on Science Instruction: Findings from a Randomized Control Trial
Joseph Taylor, BSCS, jtaylor@bscs.org
Stephen R. Getty, BSCS
Susan M. Kowalski, BSCS
Christopher Wilson, BSCS
Janet Carlson, BSCS

A Model for Teacher Learning in the Context of a Curriculum Renewal
Fer Coenders, University of Twente, fer.coenders@utwente.nl
Cees Terlouw, Saxion Universities of Applied Sciences

Content vs. Process within Systemic Reform: The Narrative Construction of a Science Teaching Identity
Richard H. Kozoll, DePaul University, rkozoll@depaul.edu

Fostering the Development of Quantitative Life Skills through Introductory Science: Can it be Done?
Katherine B. Follette, University of Arizona, kate.follette@gmail.com
Donald McCarthy, University of Arizona
Erin Dokter, University of Arizona

Building New Assessments for the “New Biology”: Establishing Content Validity for a Genomics and Bioinformatics Test
Chad Campbell, The Ohio State University, campbell.742@osu.edu
Ross H. Nehm, The Ohio State University
Brian Morton, Barnard College, Columbia University

Using Machine-Learning Methods to Detect Key Concepts and Misconceptions of Evolution in Students’ Written Explanations
Minsu Ha, The Ohio State University, ha.101@osu.edu
Ross H. Nehm, The Ohio State University

Guiding Attention on Physics Problems Using Visual Cues Modeled After Experts’ Eye Movements
Adrian C. Madsen, Kansas State University, adrianc@phys.ksu.edu
Amy Rouinfar, Kansas State University
Allison Coy, Kansas State University
Adam Larson, Kansas State University
Lester C. Loschky, Kansas State University
N. Sanjay Rebello, Kansas State University

Strand 10: Curriculum, Evaluation, and Assessment
Assessment Development and Application in Undergraduate Sciences
2:15pm – 3:45pm, Room 308

Fostering the Development of Quantitative Life Skills through Introductory Science: Can it be Done?
Katherine B. Follette, University of Arizona, kate.follette@gmail.com
Donald McCarthy, University of Arizona
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Adam Larson, Kansas State University
Lester C. Loschky, Kansas State University
N. Sanjay Rebello, Kansas State University

Islam and Evolutionary Science: Secondary Students’ Conceptions of Evolution from Five Countries
Anila Asghar, McGill University, anila.asghar@mcgill.ca
Joshua Rosenau, National Center for Science Education
Jason R. Wiles, Syracuse University
Saouma B. Boujaoude, American University of Beirut
Minoo Derayeh, York University
Quinn O., McGill University
Brian Alters, Chapman University

Interrelating Attitudes toward Evolution, Climate Change, and Genetic Engineering in Students’ Lives
David E. Long, Valdosta State University, delong@valdosta.edu

Strand 11: Cultural, Social, and Gender Issues
Religion, Evolution, and Indigenous Science: National and International Contexts
2:15pm – 3:45pm, Room 107
Presider:
Bhaskar Upadhyay, University of Minnesota

Islam and Evolutionary Science: Secondary Students’ Conceptions of Evolution from Five Countries
Anila Asghar, McGill University, anila.asghar@mcgill.ca
Joshua Rosenau, National Center for Science Education
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Saouma B. Boujaoude, American University of Beirut
Minoo Derayeh, York University
Quinn O., McGill University
Brian Alters, Chapman University

Interrelating Attitudes toward Evolution, Climate Change, and Genetic Engineering in Students’ Lives
David E. Long, Valdosta State University, delong@valdosta.edu
How Universal is Students’ Interest in Biology?
Correlation between Interest in Biology, Gender, Culture and Religion
Ayelet Baram-Tsabari, Technion - Israel Institute of Technology, ayelet@technion.ac.il
Galit Hagay, Technion - Israel Institute of Technology
Jaume Ametller, University of Leeds
Gultekin Cakmakci, Hacettepe University
Betina Lopes, University of Aveiro
Aurora Moreira, University of Aveiro
Helena Pedrosa-de-Jesus, University of Aveiro

Imaginary Subjects: School Science, Indigenous Students, and Knowledge–Power Relations
Eleanor D. Abrams, University of New Hampshire, eleanor.abrams@unh.edu
Joanna Kidman, University of Wellington, New Zealand
Hiria McRae, University of Wellington New Zealand

Strand 12: Educational Technology
Evaluation and Instrumentation of Technological Endeavors
2:15pm – 3:45pm, Room 101

An Animation-based Approach to Clarify the Meanings of Questions in a Technology-enhanced Science Learning Environment Preference Questionnaire
Yu-Ta Chien, National Taiwan Normal University, yutachien@ntnu.edu.tw
Chun-Yen Chang, National Taiwan Normal University

Development of a Short Form Measure of Science and Technology Self-Efficacy using Rasch Analysis
Richard L. Lamb, George Mason University, lambr9137@gmail.com
David B. Vallett, George Mason University
Leonard A. Annetta, George Mason University
Rebecca Cheng, George Mason University

Analytical Framework to Assess Scientific Discourse in Connected Science Classrooms
Soon C. Lee, Ohio State University, lee.3552@osu.edu
Karen E. Irving, Ohio State University

Strand 13: History, Philosophy, and Sociology of Science Elementary Teachers’ View of NOS
2:15pm – 3:45pm, Room 102

Exploring How Elementary Teachers Translate Their Nature of Views into Classroom Practice after a Graduate Level Nature of Science Course
Hasan Deniz, University of Nevada Las Vegas, hasan.deniz@unlv.edu
Elif Adibelli, University of Nevada Las Vegas
Mehmet F. Dulger, University of Nevada Las Vegas

Factors Affecting Early Elementary (K-4) Teachers’ Introduction of the Nature of Science
Sophia L. Sweeney, Northeastern State University, sweeney@nsuok.edu
William F. Mecornas, University of Arkansas

Preservice Elementary Science Teachers’ Connections among Aspects of NOS: Toward a Consistent, Overarching Framework
Sinan Ozgelen, Mersin University, sozgelen@gmail.com
Deborah L. Hanusein, University of Missouri-Columbia
Ozgul Yilmaz-Tuzun, Middle East Technical University

Strand 14: Environmental Education
Fostering Decision Making to Promote Sustainable Environmental Attitudes and Behaviours
2:15pm – 3:45pm, Room 103

Learning for Environmental Decision-Making
Sameer Honwad, sameervhonwad@gmail.com

Human Nature: Chemical Engineering University Students’ Attitudes about Human Relationships with the Natural World
Daphne Goldman, Beit Berl Academic College, dafnag@netvision.net.il
Orit Ben-Zvi Assaraf, Ben Gurion University of the Negev, Israel
Julia Dranik, Ben Gurion University of the Negev, Israel

Urban Elementary Students’ Ideas about the Environment, Activism, and Jobs
Daniel L. Dickerson, Old Dominion University, ddickers@odu.edu
Stephanie Hathcock, Old Dominion University

Being Responsible and Respectful: A Case Study of Collective Knowledge Building
Mijung Kim, University of Victoria, mjkim@uvic.ca
Hoe Teck Tan, Singapore School of Science and Technology
2:15pm - 5:30pm

Strand 15: Policy
Symposium - Developing Resources that Connect Learning Progression Research to Science Standards
2:15pm – 3:45pm, Room 104

Presider:
Aaron D. Rogat, Teachers College, Columbia University

Discussant:
Amelia Wenk Gotwals, Michigan State University

Presenters:
Joseph S. Krajcik, Michigan State University
Marianne Wiser, Clark University
Jennifer Hicks, Indiana Department of Education
Stephen Pruitt, Achieve

Concurrent Session #9
4:00pm – 5:30pm

Strands 1 and 2 Joint Sponsored Administrative Session Symposium – Connecting Research and Practice of Science Education: A Symposium in Honor of Phil Scott
4:00pm – 5:30pm, Room 313

Presiders:
Jan H. Van Driel, janvandriel@aol.com
Xiufeng Liu, State University of New York at Buffalo
J. Randy McGinnis, University of Maryland

Presenters:
Eduardo F. Mortimer, Universidade Federal de Minas Gerais, Brazil
Asma Almahrouqi, University of Leeds
Edenia Ribeiro do Amaral, Universidade Federal Rural de Pernambuco
Jouni Viiri, University of Finland
Carl Angell, University of Oslo, Norway
Jonathan Emberton, Teacher of Physics in the North of England
Jim Ryder, University of Leeds, UK

Strand 1: Science Learning, Understanding and Conceptual Change
Learning Using Mental and Conceptual Models
4:00pm – 5:30pm, Room 310

Presider:
Saouma B. Boujaoude, American University of Beirut

Learning Ecology in a 3rd Grade Classroom Using Design-based Learning: An Embodied Modeling Approach
Amanda C. Dickes, Vanderbilt University, amanda.c.dickes@vanderbilt.edu
Pratim Sengupta, Vanderbilt University
Gokul Krishnan, Vanderbilt University

Learning University Physics Using Multiple Representations
David F Treagust, Curtin University Perth Australia, d.f.treagust@curtin.edu.au
Yen-Ruey Kho, Curtin University Perth Australia
Marjan Zadnik, Curtin University Perth Australia
Salim Siddiqui, Curtin University Perth Australia
Mihye Won, Curtin University Perth Australia

Supporting Students’ Conceptual Change in Physics: Utilizing Teaching Strategies from the OGEM Cycle
Grant Williams, St. Thomas University, grantw@stu.ca

Learning about Chemical Energy: Mapping the Progression Landscape
Vicente A. Talanquer, University of Arizona, vicente@u.arizona.edu

Strand 2: Science Learning: Contexts, Characteristics and Interactions
School Contexts
4:00pm – 5:30pm, Room 302

Presider:
Martina Nieswandt, University of Massachusetts, Amherst

Contestation and Labeling across the Spectrum of Inclusive Urban Science Education and Teacher Preparation
Nicole K. Grimes, York Preparatory School, nkygrimes@gmail.com
Wesley Pitts, Lehman College, CUNY

Developing Decision-making about a Familiar Socio-scientific Issue: A Four Nation Comparison
Marcus Grace, University of Southampton, UK, mmg1@soton.ac.uk
Yeung C. Lee, Hong Kong Institute of Education
Anita Wallin, University of Gothenburg, Sweden
Roman Asshoff, Münster University, Germany

Exploring the Potential of Gamification for Urban Science Education
Christopher Emdin, Teachers College Columbia University, ce2165@columbia.edu
Joey J. Lee, Teachers College Columbia University
J. Hammer, Teachers College Columbia University
Jenny D. Ingber, Bank Street College of Education

Effects of Class Size and School Location on Students’ Perception of Learning Environment in Turkey
Muhammet Mustafa Alpaslan, Texas A&M University, alpaslan27@tamu.edu
Nevzat Yigit, Karadeniz Technical University
Yasin Cinevre, Karadeniz Technical University, Trabzon, Turkey
Bilal Balcin, Karadeniz Technical University, Trabzon, Turkey
Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies
Teacher Knowledge
4:00pm – 5:30pm, Room 301
Presider:
Therese B. Shanahan, University of California - Irvine

Improving Teacher Pedagogical Content Knowledge and Student Science Understanding with Inquiry-based Science Kits
Sarah J. Brasiel, Edvance Research, Inc., sbrasiel@edvanceresearch.com

Preservice Elementary Teachers’ Pedagogical Content Knowledge of Inquiry-based Astronomy Investigations
Julia D. Plummer, Pennsylvania State University, jdp17@psu.edu
Arzu Tanis Ozcelik, Pennsylvania State University

Investigating the Impact of Teachers’ Physics Content Knowledge on Students’ Interest in Elementary School Science
Annika Ohle, University Duisburg-Essen, Annika.Ohle@uni-due.de
Hans E. Fischer, University Duisburg-Essen

Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies
Symposium - Learning from Children: A Conversation about Science Education in the Early Years
4:00pm – 5:30pm, Room 303
Discussant:
Cynthia C. Deaton, Clemson University

Presenters:
Cassie Quigley, Clemson University, cassieq@clemson.edu
Christina Siry, University of Luxembourg
Deborah C. Smith, Penn State University
Bhaskar Upadhyay, University of Minnesota
Maria Varelas, University of Illinois at Chicago
Lynne Pieper, University of Illinois at Chicago
Amy Arsenault, University of Illinois at Chicago

Strand 5: College Science Teaching and Learning (Grades 13-20)
Fostering Problem Solving Skills
4:00pm – 5:30pm, Room 304
Presider:
Ross H. Nehm, The Ohio State University

Building a Valid and Reliable Assessment of Physics Identity
Geoff Potvin, Clemson University, gpotvin@clemson.edu
Kylie Page, Clemson University
Carrie E. Beattie, Clemson University

Does Explicit Problem Solving Teaching Strategy Improve Pre-service Elementary Teachers’ Problem Solving Ability in Chemistry?
Lloyd M. Mataala, Western Michigan University, lloyd.m.mataala@gmail.com
William W. Cobern, Western Michigan University
George V. Akom, University of Hong Kong

Facilitating Students’ Transfer of Learning in Physics Problem Solving Using a Computer-Based Assessment
Dehui Hu, Kansas State University, dehuhu@phys.ksu.edu
Joshua Von Korff, Kansas State University
N. Sanjay Rebello, Kansas State University

Undergraduate Life Science Students’ Critical Evaluation of Research Articles
Edwin B. Van Lacum, University of Groningen, e.b.van.lacum@rug.nl
Miriam A. Ossevoort, University of Groningen
Martin J. Goedhart, University of Groningen

Strand 6: Science Learning in Informal Contexts
Gender and Science: Understanding Boys and Girls Engagement with Out-of-School Science
4:00pm – 5:30pm, Room 305
Presider:
Lynn D. Dierking, Oregon State University

An Exploration of Girls’ Socialization Patterns in a High School: University Science Partnership Program
Megan E. Faurot, Illinois Institute of Technology, mfaurot@hawk.iit.edu
Stephen A. Bartos, Illinois Institute of Technology
Norman G. Lederman, Illinois Institute of Technology
Teresa K. Woodruff, Northwestern University
Cathryn Smeyers, Northwestern University
Nadia Reynolds, Northwestern University

Innovating to Address Community Needs: Girls Learning 21st Century Skills of Innovation in Out-of-School Science
Melissa Koch, SRI International, melissa.koch@sri.com
Patrik Lundh, SRI International
Christopher J. Harris, SRI International

Informal Science Inquiry in U.S. Boy Scouts’ Science and Technology Merit Badges
Matthew E. Vick, University of Wisconsin-Whitewater, vickm@uww.edu

The Impacts of Informal Science on Girls’ Interest, Engagement, and Participation in Science Communities, Hobbies and Careers
Lynn D. Dierking, Oregon State University, dierkinl@science.oregonstate.edu
Dale McCready, Franklin Institute Science Museum
Jessica Luke, Institute for Learning Innovation
4:00pm - 5:30pm

Strand 7: Pre-service Science Teacher Education  
Pre-service Science Teachers’ Understanding and Usage of Various Assessment Strategies  
4:00pm – 5:30pm, Room 306  
Presider: Tamara H. Nelson, Washington State University Vancouver

Preservice Formative Assessment Interviews: The Development of Responsive Questioning  
Julie Amador, Indiana University, jamador@indiana.edu  
Ingrid S. Weiland, University of Louisville  
Rick Hudson, University of Southern Indiana

Exploring Portfolio Assessment in Saudi Pre-service Science Teachers’ Education Program  
Hiya Almazroa, Princess Nora Bint Abdul Rahman University, hmalmazroa@pnu.edu.sa

Diagnosis in Teacher Education – Theoretical and Methodological Considerations  
Claudia von Aufschnaiter, University of Giessen, Claudia.von-Aufschnaiter@didaktik.physik.uni-giessen.de  
Gabi Duebbelde, Justus Liebig University of Giessen  
Juergen Mayer, University of Kassel  
Andrea Moeller, University of Trier  
Joachim Stiensmeyer-Pelker, Justus Liebig University Giessen  
Anett Wolgast, Justus Liebig University Giessen  
Janine Cappell, Justus Liebig University Giessen

Eliciting, Identifying, Interpreting and Responding to Students’ Ideas: Teacher Candidates Growth in Formative-Assessment Practices  
Amelia Wenk Gotwals, Michigan State University, gotwals@msu.edu  
Daniel Birmingham, Michigan State University

Strand 8: In-service Science Teacher Education  
Using Technology to Facilitate Professional Development  
4:00pm – 5:30pm, Room 105  
Presider: Marissa S. Rollnick, Wits University

Professional Development Integrating Technology - Does Delivery Format Matter?  
Lori Rubino-Hare, Northern Arizona University, lori.hare@nau.edu  
Jennifer Claesgens, Northern Arizona University  
Kristi Fredrickson, Northern Arizona University  
Nena Bloom, Northern Arizona University  
Carol Henderson-Dahms, Southwest Evaluation Research, LLC  
James Sample, Northern Arizona University  
Mark Manone, Northern Arizona University

Promoting a Learning Community: Using Wikis in a Professional Development Program for Chemistry Teachers  
Yael Shwartz, Weizmann Institute of Science, yael.shwartz@weizmann.ac.il  
Dvora Katchevitch, Weizmann Institute of Science

The Use of Blogging as a Tool to Support Teachers’ Identity Development as Leaders  
Deborah L. Hanuscin, University of Missouri, hanuscind@missouri.edu  
Ya-Wen Cheng, University of Missouri  
Carina M. Rebello, University of Missouri  
Somnath Sinha, University of Missouri  
Nilay Muslu, University of Missouri, Columbia

Development of a Teacher Training Course on the Use of Computer Aided Material in Science  
Manuela Welzel-Breuer, University of Education Heidelberg, Germany, welzel@ph-heidelberg.de  
Jari Lavonen, University of Helsinki, Finland  
Helga Stadler, University of Vienna, Austria  
Zhelyazka Raikova, University of Plovdiv “Paisii Hilendarski”, Bulgaria  
Roger Erb, University of Education Schwabisch Gmuend, Germany  
Karine Béchu-Robinsault, University of Lyon, France  
George S. Ioannidis, University of Patras, Greece  
Sönke Graf, University of Education Heidelberg, Germany  
Clemens Nagel, University of Vienna, Austria

Teaching the Content in Context: Preparing Science Teachers for Meaningful, Relevant Instruction in Underserved Classrooms  
Sara E. Tolbert, University of Arizona, saratolbert@email.arizona.edu

Preparing Teachers for Teaching in High-need Schools: A Comparison of Two Science Education Programs  
Kevin Goff, College of William & Mary, kdgoff@email.wm.edu  
Juanita Jo Matkins, College of William & Mary  
Jacqueline Theresa Mcdonnough, Virginia Commonwealth University
Strand 8: In-service Science Teacher Education
Teachers Learning Content, Inquiry, and Universal Design
4:00pm – 5:30pm, Room 106

**Presider:**
Irene U. Osisioma, California State University, Dominguez Hills

**Assessing an Innovative Program for K-12 Teachers that Integrates Scientific Inquiry with UDL**
Peter Meyerson, University of Wisconsin Oshkosh, meyerson@uwosh.edu
Stacey Skoning, University of Wisconsin Oshkosh
John Lemberger, University of Wisconsin Oshkosh

**Case Studies in Teacher Content Learning in a Problem-Based Learning Professional Development Setting**
Tom J. McConnell, Ball State University, tjmcconnell@bsu.edu
Joyce M. Parker, Michigan State University
Jan Eberhardt, Michigan State University

**Supporting Inquiry-Rich Teaching through Professional Development within a District-Higher Education Partnership**
Jay A. Fogleman, University of Rhode Island, fogleman@mail.uri.edu
Joshua Caulkins, University of Rhode Island
Sarah Knowlton, Rhode Island College
Laura Schifman, University of Rhode Island
Daniel Murray, University of Rhode Island

**A Vygotskian Theoretical Framework for Understanding High School Science Teachers’ Talk in Professional Development**
Victoria M. Deneroff, Georgia College & State University, victoria.deneroff@gsu.edu

**Instructional and School Factors and their Influence on Science Competencies**
Nai-en Tang, University of Missouri-Columbia, naien.tang@missouri.edu
Chia-Lin Tsai, University of Missouri-Columbia
Lloyd H. Barrow, University of Missouri

**Assessment Tools for Studying the Effect of Educative Curriculum Materials**
Peggy Trygstad, Horizon Research, Inc., ptrygstad@horizon-research.com
P. Sean Smith, Horizon Research, Inc.
Elizabeth A. Davis, University of Michigan
Annemarie S. Palincsar, University of Michigan

**Assessing the Quality of Teaching of Brown’s Pre-College Courses**
Esther L. Zirbel, Brown University, esther_zirbel@brown.edu
Robin Rose, Brown University
James Chansky, Brown University
Maria Byerly, Brown University

Strand 10: Curriculum, Evaluation, and Assessment
Approaches to Measures of Curriculum Effectiveness
4:00pm – 5:30pm, Room 308

**Presider:**
Christopher Wilson, BSCS

**Advancing Tools for Research on Science Instruction: Results from the National Field Test of a Classroom Observation Protocol**
Jacqueline Delisi, Education Development Center, Inc., jdelisi@edc.org
Daphne Minner, Abt Associates, Inc.
Linda Hirsch, Education Development Center, Inc.
Ruth Krumhansl, Education Development Center, Inc.

**Factors at the School Level Contributing to Reduced Achievement Gaps on Elementary Science Tests**
John Settlage, University of Connecticut, john.settlage@uconn.edu
Regina Suriel, University of Connecticut

**Strand 11: Cultural, Social, and Gender Issues**
Exploring Elementary Science Education and Parent Participation for STEM Pipeline
4:00pm – 5:30pm, Room 107

**Presider:**
Felicia M. Mensah, Teachers College, Columbia University

**Effective Urban Elementary Teachers of Inquiry Science: Beliefs, Knowledge, and Resources Shaping Teacher Planning**
Elaine M. Silva Mangante, University of Rhode Island, emangante@cox.net

**Exceptional Practices and Unconventional Norms: Parents’ Initiatives for assisting their Children’s STEM Learning**
Rashmi Kumar, University of Pennsylvania, rashmikumar@gmail.com

**Geeks or Freaks? How Primary School Children View Science-keen Peers**
Jennifer DeWitt, King’s College London, jennifer.dewitt@kcl.ac.uk
Louise Archer, King’s College London
Jonathan F. Osborne, Stanford University

**Factors at the School Level Contributing to Reduced Achievement Gaps on Elementary Science Tests**
John Settlage, University of Connecticut, john.settlage@uconn.edu
Regina Suriel, University of Connecticut
Strand 12: Educational Technology
Symposium - Digital Resources to Support Science Instruction: Research, Development and Practice
4:00pm – 5:30pm, Room 101

*Presider:* Alice Anderson, Education Development Center, Inc.

*Discussant:* Eric N. Wiebe, North Carolina State University

*Presenters:*
Lauren Goldenberg, Education Development Center, Inc.
Catherine E. Milne, New York University
Ruth Schwartz, New York University
Mimi Recker, Utah State University
Al Byers, National Science Teachers Association
Chad Dorsey, The Concord Consortium
Marian Pasquale, Education Development Center, Inc.
Ted Sicker, WGBH Teachers’ Domain

Strand 13: History, Philosophy, and Sociology of Science
Assessing NOS
4:00pm – 5:30pm, Room 102

*Presider:* Jonah B. Firestone, Arizona State University

*Pathways of a Humanistic Approach to Science Education: A Review of the Literature*
Jeremy Price, Boston College, jeremy.price@bc.edu

*Turkish Preservice Teachers’ Epistemological beliefs in Physics, Chemistry, and Biology: A Mixed Study*
Mustafa S. Topcu, Mugla University, msamitopcu@gmail.com

*Development and Validation of a Rubric to Score the Views of Nature of Science (VNOS) Questionnaire*
Fouad Abd-El-Khalick, University of Illinois at Urbana-Champaign, fouad@illinois.edu
Jeremy Belarmino, University of Illinois at Urbana-Champaign
Ryan Summers, University of Illinois at Urbana-Champaign

*Using Text Mining Technique to Categorize Science Writings According to Their Inclusion of Nature of Science: Implications for Practice and Research*
Feng Jiang, University of Arkansas, fjiang@uark.edu
William F. Mccomas, University of Arkansas

Strand 14: Environmental Education
Using Placed-based Frameworks to Engage Learners in Environmental Education
4:00pm – 5:30pm, Room 103

*Presider:* Rita Hagevik, The University of North Carolina at Pembroke

*Merger Place-based Environmental Science and Traditional Ecological Knowledge in Secondary and Postsecondary Educational Settings*
Daniel R. Zalles, SRI International, daniel.zalles@sri.com
Brian D. Collins, University of Washington
Cynthia Updegrave, University of Washington
David R. Montgomery, University of Washington
Thomas G. Colonese, University of Washington
Amir J. Sheikh, University of Washington, Seattle

*Engaging Underrepresented Youth through the Enactment of an Urban Environmental and Geoscience Place-based Curriculum*
Amy DeFelice, CUNY, amyferguson3@hotmail.com
Jennifer D. Adams, Brooklyn College- CUNY
Pieranna Pieroni, Brooklyn College- CUNY
Brett Branco, Brooklyn College- CUNY

*Teaching Earth Smarts: A Pragmatic, Nonpartisan Educational Construct for Socioecological Literacy*
Bryan H. Nichols, University of South Florida, bryanhnichols@gmail.com
Dana L. Zeidler, University of South Florida

*This is More Like Home: Enriching Students’ I-Thou Relationship with Nature through Community Mapping*
Susan Jagger, OISE/University of Toronto, sjagger@utoronto.ca
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, Room 101
Presiders:
Reizelie Barreto-Espino, Towson University

Springer Publishing Reception
By Invitation
6:00pm – 8:30pm, White River Ballroom A - B

Equity and Ethics Committee Sponsored Dinner
7:00pm – 9:00pm, Off-site – Buca di Beppo
Italian Restaurant
Dinner, including tax and gratuity, is $35.
NOTE: You must register for this event with your Advance Conference Registration (90 participants max).

Social
8:00pm – 10:30pm, White River Ballroom E
Conference Registration
7:00am – 12:00pm, White River Registration

Strand Meetings
7:00am – 8:15am

Strand 1: Science Learning, Understanding and Conceptual Change
Meeting—7:00am – 8:15am, Room 301

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Meeting—7:00am – 8:15am, Room 302

Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies
Meeting—7:00am – 8:15am, Room 303

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies
Meeting—7:00am – 8:15am, Room 304

Strand 5: College Science Teaching and Learning (Grades 13-20)
Meeting—7:00am – 8:15am, Room 305

Strand 6: Science Learning in Informal Contexts
Meeting—7:00am – 8:15am, Room 306

Strand 7: Pre-service Science Teacher Education
Meeting—7:00am – 8:15am, Room 308

Strand 8: In-service Science Teacher Education
Meeting—7:00am – 8:15am, Room 313

Strand 9: Reflective Practice
Meeting—7:00am – 8:15am, Room 206

Strand 10: Curriculum, Evaluation, and Assessment
Meeting—7:00am – 8:15am, Room 311

Strand 11: Cultural, Social, and Gender Issues
Meeting—7:00am – 8:15am, Room 312

Strand 12: Educational Technology
Meeting—7:00am – 8:15am, Room 314

Strand 13: History, Philosophy, and Sociology of Science
Meeting—7:00am – 8:15am, Grand Ballroom V-A

Strand 14: Environmental Education
Meeting—7:00am – 8:15am, Grand Ballroom V-B

Strand 15: Policy
Meeting—7:00am – 8:15am, Grand Ballroom VI-A

Concurrent Session #10
8:30am – 10:00am

Equity and Ethics Committee Sponsored Session
New Scholars Symposium Sponsored by the Equity and Ethics Committee: Teaching and Learning Science in Diverse Contexts -- Local and Global Perspectives
8:30am – 10:00am, Room 313
Presider:
Bhaskar Upadhyay, University of Minnesota
Discussant:
Valarie L. Akerson, University of Indiana-Bloomington
Presenters:
Femi Otulaja, University of Witwatersrand-Johannesburg, South Africa
Vanashri Nargund-Joshi, Indiana University-Bloomington
Minjung Ryu, University of Maryland-College Park
Nai-en Tang, University of Missouri-Columbia
Idaykis Rodriguez, Florida International University-Miami
Renee Michelle Goertzen, Florida International University-Miami
Eric Brewe, Florida International University-Miami
Laird H. Kramer, Florida International University-Miami
Ingrid M. Sanchez Tapia, University of Michigan
Consuelo J. Morales, University of Michigan
Teresa Satterfield, University of Michigan
Jean Rockford Aguilar-Valdez, University of North Carolina at Greensboro
Nievita Bueno Watts, Purdue University

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Science Inquiry
8:30am – 10:00am, Room 302
Presider:
Jonathan F. Osborne, Stanford University
Inquiry and Elementary Science Learning: Evidence from a Randomized Trial of the Science Writing Heuristic
Mack Shelley, Iowa State University, mshelley@iastate.edu
Christopher Gorwa-Reeves, Iowa State University
Joan Baenziger, Iowa State University
Ashley Seefeld, Iowa State University
Brian M. Hand, University of Iowa
William Therrien, University of Iowa
Integrating the Outdoor Learning Environment into Formal Science: Testing the Model across Culture and Age
Molly L. Yunker, Weizmann Institute of Science, mollyyunker@weizmann.ac.il
Nir Orion, Weizmann Institute of Science

Assessment of Group Learning in Interdisciplinary Environments
Bijaya Aryal, University of Minnesota-Rochester, baryal@umn.edu
Robert L. Dunbar, University of Minnesota-Rochester
Rajeev S. Muthyala, University of Minnesota-Rochester

Studying the Process of Decision-making in an Inquiry-based Module
Eduardo F. Mortimer, Universidade Federal de Minas Gerais Brazil, mortimer@ufmg.br
Fábio Augusto R. Silva, Universidade Federal de Ouro Preto Brazil

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Secondary Science
8:30am – 10:00am, Room 311
Presider:
Phyllis Katz, University of Maryland

Hearing the Meanings Expressed by High School Students of Science: A Qualitative Study
Jeremy Price, Boston College, jeremy.price@bc.edu

The Influence of Lab Activities, Teacher Certification and Subject on Students’ Engagement, Motivation and Learning
Diana J. Zaleski, Northern Illinois University, DZaleski07@gmail.com
Lee Shumow, Northern Illinois University
Jennifer A. Schmidt, Northern Illinois University

Positionality in the Physics Classroom: Implications for Student Engagement
Zahra Hazari, Clemson University, zahra@clemson.edu
Cheryl A.P. Cass, North Carolina State University
Carrie E. Beattie, Clemson University
Robynne M. Lock, Clemson University

Comparative Study of the Learning Environments of Secondary Science Classrooms in Government and Private Schools
Adit Gupta, Model Institute of Education and Research, Jammu, India, aditgupta@yahoo.com

Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies
Related Paper Set - Beyond Student Test Scores: A More Comprehensive Look at Quality of Teaching
8:30am – 10:00am, Room 301
Discussant:
Kathleen J. Roth, BSCS

Examining Quality of Teaching from Different Perspectives
Maria Araceli Ruiz-Primo, University of Colorado Denver, maria.ruiz-primo@ucdenver.edu
Min Li, University of Washington

Knowledge of Learning Goals as a Navigation Tool in Curriculum Implementation
Ming-Chih Lan, University of Washington, mclan@uw.edu
Michael Giamellaro, University of Colorado Denver
Min Li, University of Washington
Maria Araceli Ruiz-Primo, University of Colorado Denver

Supporting Students to Make Conceptual Connections
Min Li, University of Washington, minli@u.washington.edu
Ming-Chih Lan, University of Washington
Maria Araceli Ruiz-Primo, University of Colorado Denver
Michael Giamellaro, University of Colorado Denver
Ting Wang, University of Washington
Jennifer Feehan, University of Colorado Denver
Mchale Aaron Orgeron, University of Colorado Denver

Quality Teaching as Reflected in Productive Failure
Michael Giamellaro, University of Colorado Denver, michael.giamellaro@ucdenver.edu
Maria Araceli Ruiz-Primo, University of Colorado Denver
Min Li, University of Washington
Kellie Wills, University of Washington

Knowing where Students are: Finding out What Students Know and Moving their Learning Forward
Hillary Mason, Hillary.Mason@ucdenver.edu
Maria Araceli Ruiz-Primo, University of Colorado Denver
Min Li, University of Washington
Michael Giamellaro, University of Colorado Denver
Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies
Inquiry Based Teaching and Learning
8:30am – 10:00am, Room 303
**Presider:** Jodie Galosy, Knowles Science Teaching Foundation

Influences on Teachers’ Capacities to use Educative Curriculum Materials as Intended
Sihan Xiao, University of California, Los Angeles, sbxiao@ucla.edu
William A. Sandoval, University of California, Los Angeles

Cooperative Learning and Intergroup Competition in Biology Education
Sarah Sennebogen, University of Munich (LMU), Sarah.Sennebogen@lrz.uni-muenchen.de
Birgit Jana Neuhaus, University of Munich (LMU)

Project-Based Teaching: Supporting Students in Making Connections
Heather J. Johnson, Vanderbilt University, heather.j.johnson@vanderbilt.edu

iCoach-Teacher Teams Professional Development: The Influence of Coach led Reflection, Practice Teaching, and Content Instruction on Middle School Teachers’ Use of Inquiry Practices
Christine R. Lotter, University of South Carolina, lotter@mailbox.sc.edu
Jan Yow, University of South Carolina

Strand 5: College Science Teaching and Learning (Grades 13-20)
Developing Conceptual Understanding in Science
8:30am – 10:00am, Room 304
**Presider:** Leigh S. Arino De La Rubia, Tennessee State University

Tracking College Students’ Growth in Understanding of the Particulate Nature of Matter
James M. Nyachwaya, University of Minnesota, nyach002@umn.edu
Jamie L. Schneider, University of Wisconsin, River Falls
Nathan B. Wood, North Dakota State University
Abdirizak W. Mohammed, University of Minnesota
Anne L. Kern, University of Idaho
Gillian Roehrig, University of Minnesota

Improving College Students’ Interdisciplinary Science Understanding
Shannon Sung, The University of Georgia, shasung@uga.edu
Ji Shen, The University of Georgia
Kathrin Stanger-Hall, The University of Georgia

University Students’ Informal Reasoning
Progression on NDM-1 Socio-scientific Issue: A Preliminary Study
Tzu-Chun Huang, National Taichung University, smy@mail.ntcu.edu.tw
Shu-Mey Yu, National Taichung University
Yu-Hsiang Su, National Taichung University

Progress Made in the Development of a Conceptual Roadmap for Chemistry and Nanoscience Education
Alan K. Szeto, Purdue University Calumet, alan.szeto@purduecal.edu

Strand 6: Science Learning in Informal Contexts
Fostering Complex Learning in Museums
8:30am – 10:00am, Room 305
**Presider:** Jennifer DeWitt, King’s College London

Re-Imagining Science Museums: Communities of Environmental Lifelong Learners
Kathleen A. Fadigan, Pennsylvania State University, kxf24@psu.edu

Guiding Play with Technology to Improve Science Affect and Learning
David E. Kanter, New York Hall of Science, dkanter@nysci.org
Sameer Horwad, New York Hall of Science
Cheryl Kwinn, Tufts University
Adiel Fernandez, New York Hall of Science

Learning at the Museum: Aspects of Learning in German Natural History Museums from the Museum Educator’s Point of View
Jennifer H. Harting, Jennifer.Haerting@uni-vechta.de

Using Educational Research in the Development of Science Exhibitions
Antti Laherto, University of Helsinki, Finland, antti.laherto@helsinki.fi

Strand 7: Pre-service Science Teacher Education
Technology in Pre-Service Teacher Education
8:30am – 10:00am, Room 306
**Presider:** Kristin L. Cook, Indiana University

Investigating Pre-service Science Teachers’ Content Knowledge And Perceived TPACK Regarding Genetics
Meltem Savas, Middle East Technical University, msavas@metu.edu.tr
Ozgul Yilmaz-Tuzun, Middle East Technical University
Preservice Teachers as eMentors: Using Web 2.0 Learning Tools To Foster Student Inquiry
Gabriela Jonas-Ahrend, University of Dortmund, gabriela.jonas-ahrend@uni-dortmund.de
M. Randall Spaid, Macon State College
Stuart Fleischer, The American International School in Israel

Using Blogging as a Disruptive Design for Learning in Pre-Service Teacher Education Courses
Janice L. Anderson, University of North Carolina at Chapel Hill, anderjl@email.unc.edu
Julie E. Justice, University of North Carolina at Chapel Hill
Steven D. Wall, University of North Carolina at Chapel Hill

Using PhotoVoice to Empower Pre-service Teachers to Connect Science to Their Daily Lives
Kristin L. Cook, Indiana University, kshockey@indiana.edu
Cassie Quigley, Clemson University

Strand 7: Pre-service Science Teacher Education Field Experiences as a Factor in Pre-service Teacher Development II
8:30am – 10:00am, Room 312
Presider: Vanessa Kind, Durham University

Curriculum Materials Analysis as a Boundary Spanning Task: Bridging Science Methods and Field Placement Discourses
Kristin L. Gunckel, University of Arizona, kgunckel@email.arizona.edu

Examining the Role of School-Based Experiences in Preparing Pre-service Teachers for Science Teaching
Angela Fitzgerald, Monash University, Melbourne, Australia, angela.fitzgerald@monash.edu
Katrin Schneider, Monash University, Melbourne, Australia

Science Educator Identity Formation: The Impact of Place-Based Teaching Opportunities
Jennifer H. Forrester, The University of Wyoming, jforres5@uwyo.edu
Jason M. Katzmann, The University of Wyoming

Strand 8: In-service Science Teacher Education Symposium - Different Ways to Investigate Teachers’ Pedagogical Content Knowledge
8:30am – 10:00am, Room 206
Presider: Andreas Borowski, RWTH Aachen University

Presenter:
Sophie Kirchmer, University Duisburg-Essen
Janet Carlson, BSCS
Inke Henze, Radboud University, Nymegen
Julie Gess-Newsome, Willamette University
Hans E. Fischer, University Duisburg-Essen
Jan H. Van Driel, Leiden University

Examining the Role of School-Based Experiences in Preparing Pre-service Teachers for Science Teaching
Angela Fitzgerald, Monash University, Melbourne, Australia, angela.fitzgerald@monash.edu
Katrin Schneider, Monash University, Melbourne, Australia

Strand 10: Curriculum, Evaluation, and Assessment Middle School Curriculum and Evaluation
8:30am – 10:00am, Room 308
Presider: Gayle A. Buck, Indiana University

Assessing NOS Knowledge using Network Analysis: An Examination of Students’ Growth in a Contextualized Environment
Erin E. Peters-Burton, George Mason University, epeters1@gmu.edu

The Effects of Coherent Curriculum on Middle School Students’ Understanding of Key Chemistry Ideas
Joseph S. Krajcik, Michigan State University, krajcik@umich.edu
LeeAnn M. Sutherland, University of Michigan
Sung-Youn Choi, University of Michigan
Joi Merritt, Michigan State University
Kathryn F. Drago, University of Michigan

Students’ Errors Using Geographically Variable Data to Support Scientific Predictions
Sarah J. Fick, University of Michigan, sfdick@umich.edu

Results from a Pilot Study of a Curriculum Unit Designed to Help Middle School Students Understand Chemical Reactions in Living Systems
Cari F. Herrmann Abell, AAAS/Project 2061, cabell@aaas.org
Jean C. Flanagan, AAAS Project 2061
Jo Ellen Roseman, AAAS Project 2061
Strand 10: Curriculum, Evaluation, and Assessment
Science Assessment: Approaches and Issues
8:30am – 10:00am, Room 314

Presider:
David F. Treagust, Curtin University

How Stable are Students’ Understanding of Light Propagation and Visibility of Objects in Different Contexts?
Hye-Eun Chu, Nanyang Technological University, hyeeun.chu@gmail.com
David F. Treagust, Curtin University

Development and Validation of Instrument for Exploring High School Students’ Conceptions of Science Assessment in Taiwan
Min-Hsien Lee, National Central University, Taiwan, lee.minhsien@gmail.com
Tsung-Jin Lin, National Taiwan University of Science and Technology, Taiwan
Chin-Chung Tsai, National Taiwan University of Science and Technology, Taiwan

Children’s Perceptions on Primary Science Assessment
Colette Murphy, Queen’s University Belfast, c.a.murphy@qub.ac.uk

Assessment of Student Reasoning in Control of Variables
Lei Bao, The Ohio State University, bao.15@osu.edu
Shaona Zhou, China Central Normal University
Jing Han, The Ohio State University
Amy Raplinger, The Ohio State University
Kathleen M. Koenig, University of Cincinnati

Strand 11: Cultural, Social, and Gender Issues
Poster Symposium - Identity and Science Education Research: Topics, Issues, and Trends
8:30am – 10:00am, Grand Ballroom V-A

Presider:
Maria Varelas, University of Illinois at Chicago

Presenters:
Megan Bang, University of Washington
Angela Calabrese Barton, Michigan State University
Philip L. Bell, University of Washington
Leah A. Bricker, University of Washington
Heidi Carlone, University of North Carolina at Greensboro
Alice Carvalho, Université de Montréal
Allison J. Gonsalves, Université de Montréal
Juanita Bautista Guerra, Michigan State University
Jennifer Hope, University of Missouri-St. Louis
Angela Johnson, St. Mary’s College of Maryland
Justine M. Kane, Wayne State University
Hosun Kang, University of Washington
Audrey Lachaine, Université de Montréal
Amanda Marin, Northwestern University,
Maria S. Rivera Maulucci, Barnard College
Elizabeth Rita Menig, University of Illinois at Chicago
Felicia M. Mersah, Teachers College Columbia University
Carole P. Mitchener, University of Illinois at Chicago
Tara B. O’Neil, University of Hawaii at Manoa
Eileen C. Parsons, University of North Carolina at Chapel Hill
Joe Polman, University of Missouri-St. Louis
Jrene Rahm, Université de Montréal
Gale A. Seiler, McGill University
Daniela Stellino, University of Illinois at Chicago,
Edna Tan, University of North Carolina at Greensboro
Katie Van Horne, University of Washington

Strand 10: Curriculum, Evaluation, and Assessment
Symposium - Argument Focused Instruction and Science Proficiency
8:30am – 10:00am, Grand Ballroom VI-A

Presider:
Victor D. Sampson, Florida State University

Presenters:
Patrick J. Enderle, Florida State University, pje07@fsu.edu
Barry Golden, University of Tennessee
Jonathon Grooms, Florida State University
Joi P. Walker, Florida State University

Strand 11: Cultural, Social, and Gender Issues
Symposium - Perspectives from the Frontline: Examining African-American Students Matriculation into Science
8:30am – 10:00am, Grand Ballroom V-B

Presenters:
Bryan A. Brown, Stanford University, bbrbrown@stanford.edu
Christopher Emdin, Teachers College Columbia University
Andre M. Green, University of South Alabama
Christopher G. Wright, T.E.R.C
Concurrent Session #11  
10:15am – 11:45am

Publications Advisory Committee Sponsored Session
10:15am – 11:45am, Grand Ballroom V-A

Presiders:
Angela Calabrese Barton, JRST Editor; Michigan State University
Joseph S. Krajcik, JRST Editor; Michigan State University
Bob Geier, Assistant JRST Editor, University of Michigan

Strand 1: Science Learning, Understanding and Conceptual Change
New Foundations for the Contribution of Prior Knowledge to Learning
10:15am – 11:45am, Room 314

Presider:
Michelle P. Cook, Clemson University

The Use of Construct Maps to Explore Student Understanding of the Chemical Reaction Big Idea
Nirit Glazer, University of Michigan, nirit@umich.edu

Exploring the Relationship between Integrated Understanding of Energy and Preparation for Future Learning
Jeffrey Nordine, Trinity University, jnordine@trinity.edu
Abigail Drake, Trinity University

Attending to Individual Differences in the Instruction of Physics: The Role of Prior Knowledge
Shulamit Kapon, Tel Aviv University, ISRAEL, kaponsh@post.tau.ac.il

Eighth-grade Students’ Mental Models of Magnetism: Modes of Agency and Mechanisms of Interaction
David Sederberg, Purdue University, dsederbe@purdue.edu

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Elementary Science
10:15am – 11:45am, Room 302

Presider:
Bhaskar Upadhyay, University of Minnesota

On Learning Ecology in Elementary Grades by Designing Robotic Animals and Their Habitats
Gokul Krishnan, Vanderbilt University, gokul.krishnan@vanderbilt.edu
Pratim Sengupta, Vanderbilt University
Amanda C. Dickes, Vanderbilt University
Amy Farris, Vanderbilt University

The Use of Drawings to Evaluate the Impact of an Out of School Environmental Education Experience
Michael W. Dentzau, Florida State University, mwd09c@my.fsu.edu
Alejandro J. Gallard, Florida State University

The Effect of Instructional Framing on Learning and Transfer of Experimental Design Skills
Stephanie Siler, Carnegie Mellon University, siler@cmu.edu
David Klahr
Kevin Willows
Cressida Magaro

An Investigation of How Cogenerative Dialogues Affect the Culture of Learning in a Pre-Service Elementary Science Learning Environment
Natan Samuels, Florida International University, nsamu002@fiu.edu
Renee Michelle Goertzen, Florida International University
Eric Brewe, Florida International University
Laird Kramer, Florida International University

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Middle Grades Science
10:15am – 11:45am, Room 311

Presider:
Noemi Waight, University at Buffalo

Can Science Inquiry Instruction Really Enhance 8th Graders’ Inquiry Competency and Self-efficacy?
Ching-Wei Tung, Lu-Kang Junior High School, Taiwan, snailms@gmail.com
Hsiao-Lin Tuan, National Changhua University of Education
Chi-Chin Chin, National Taichung University of Education
Personal and Contextual Factors as Predictors of Homework Management and Procrastination in Science Courses
Yasemin Tas, Ataturk University, tasyase@gmail.com
Semra Sungur, Middle East Technical University
Ceren Tekkaya, Middle East Technical University

Measuring Students’ Continuing Motivation
David L. Fortus, Weizmann Institute of Science, david.fortus@weizmann.ac.il
Dana Vedder Weiss, Weizmann Institute of Science

Background Demographic Characteristics: Predictors of Parent Attitudes Toward and Expectations of Middle School Science?
Leigh K. Smith, Brigham Young University, leigh_smith@byu.edu
Erika Feinauer, Brigham Young University
Erin F. Whiting, Brigham Young University
Pamela Cantrell, Brigham Young University

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Symposium - Models in Science Education: Providing Foundation, Structure & Substance for Content Knowledge, Practice & Epistemology
10:15am – 11:45am, Grand Ballroom VI-A

Presider:
Julia Svoboda, University of California, Davis

Discussant:
Brian J. Reiser, Northwestern University

Presenters:
Julia Svoboda, University of California, Davis, jmsvoboda@ucdavis.edu
Cynthia Passmore, University of California-Davis
Michael Ford, University of Pittsburgh
Melissa Braaten, University of Wisconsin
Leema Berland, University of Texas, Austin

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies
Enhancing the Understanding of NOS
10:15am – 11:45am, Room 303

Presider:
Tamara H. Nelson, Washington State University Vancouver

The Effect of Educational Fieldtrips to Professional Research Labs on Students’ NOS Understanding
Dina Tsybulskaya, The Hebrew University of Jerusalem, dina.tsybulsky@mail.huji.ac.il
Jeff Dodick, The Hebrew University of Jerusalem
Jeff Camhi, The Hebrew University of Jerusalem

The Effect of Explicit-Embedded-Reflective Instruction on Understandings of Advanced Students about Nature of Science
Mustafa S. Kolsal, Inonu University, bioeducator@gmail.com
Jale Cakiroglu, Middle East Technical University
Omer Geban, Middle East Technical University

Exploring the Nature of Science through an Online Digital Game
Isha DeCoito, York University, idecoito@edu.yorku.ca
Maurice DiGiusepppe, University of Ontario Institute of Technology

A Comparative Case Study of Two High School Biology Teachers’ Evolution and Nature of Science Teaching Practices
Lisa A. Donnelly, Kent State University, ldonnell@kent.edu

Strand 5: College Science Teaching and Learning (Grades 13-20)
Exploring Different Types of Science Learning and Teaching
10:15am – 11:45am, Room 304

Presider:
Janelle M. Bailey, University of Nevada, Las Vegas

Teaching Experiences for Researchers
Anne W. Collins, University of California, Santa Barbara, annewrigley@gmail.com

Connections to the K-12 Community that Shape the Career of Future Science Educators: A Longitudinal Study of Former Participants in a GK-12 Program
Molly S. Bolger, University of Arizona, mbolger@email.arizona.edu
Susan Kuner, Topaz Canyon Group, LLC
Doug Robinson, Topaz Canyon Group, LLC
Robert Crouch, Vanderbilt University
John A. Willis, The Brooks Besor Consultants, Inc.
Martha J. Willis, The Brooks Besor Consultants, Inc.
Jennifer A. Ufnar, Vanderbilt University
Virginia L. Shepherd, Vanderbilt University

Review of Laboratory Learning in Undergraduate Chemistry Courses
Hannah Sevian, University of Massachusetts Boston, hannah.sevian@umb.edu
Gavin W. Fulmer, National Science Foundation
**Strand 6: Science Learning in Informal Contexts**

Innovations Cultivating STEM Disciplinary Knowledge

10:15am – 11:45am, Room 305

*Presider:*
James F. Kisiel, California State University, Long Beach

**Organizational Schemes as Aids for Understanding Astronomical Content**
Jean Creighton, UWM Planetarium

**Adults’ Perception of Learning as Inspired by Awe in Nature**
Tamara C. Coleman, Western Michigan University, tcoleman@lowellschools.com

**Museum Theater as a Learning Environment for Introducing Evolution**
Ayelet Baram-Tsabari, Technion
Ran Peleg, Technion - Israel Institute of Technology

**STEM integration: Integrating Engineering to Enhance Science Learning**
Misun Park, University of Minnesota, parkls598@umn.edu
Yourkyeong Nam, University of Minnesota
Tamara Moore, University of Minnesota
Gillian Roehrig, University of Minnesota

**Strand 7: Pre-service Science Teacher Education**

Field Experiences as a Factor in Pre-service Teacher Development I

10:15am – 11:45am, Room 306

*Presider:*
J. Steve Oliver, The University of Georgia

**A Hidden Factor? Investigating the Impact Field Experience Hours on Science Teacher Attrition**
Charles B. Weeks, Arizona State University, cbweeks@asu.edu
Julie A. Luft, The University of Georgia

**Re-imaging Inquiry-Based Field-Experiences for Preservice Science Teachers**
Julie Angle, Oklahoma State University, julie.angle@okstate.edu
Donald P. French, Oklahoma State University

**A Comparison of Field and University Based Science Methods Courses’ Impact on Preservice Teacher’s Belief and Abilities to Design Instruction for Diverse Learners**
Anne P. Gatling, Merrimack College, gatlinga@merrimack.edu

**Strand 8: In-service Science Teacher Education**

Conceptions of Inquiry and the Nature of Science

10:15am – 11:45am, Room 206

*Presider:*
Carla C. Johnson, University of Cincinnati

**Elementary Education Teachers’ interest in and Conceptual Knowledge of Science Process Skills**
Frackson Mimba, Southern Illinois University Carbondale, frackson@siuc.edu
Erin Miles, Southern Illinois University Carbondale
Vivien M. Chabalengula, Southern Illinois University Carbondale

**Changing Identities and Evolving Conceptions of Inquiry through Teacher-Driven Professional Development**
Ben Van Dusen, University of Colorado Boulder, benvandusen@colorado.edu
Mike Ross, University of Colorado Boulder
Valerie Otero, University of Colorado Boulder

**Making Room for Play in the World of Kit-Based Science**
Maria S. Rivera Maulucci, Barnard College, Columbia University, mriveram@barnard.edu
Examining the Progress Made on the Nature of Science Conceptions of Science and Elementary Teachers Exposed to an Astronomy Science Summer Camp
Ayhan Karaman, Canakkale Onsekiz Mart University, akaraman@comu.edu.tr
Sezen Apaydin, Canakkale Onsekiz Mart University

Strand 9: Reflective Practice
Curriculum Development, Teacher Beliefs, and Communities of Practice
10:15am – 11:45am, Room 301

Factors that Influence the Translation of Teachers’ Self-efficacy in Teaching Science as Inquiry into Practice
Nattida Promyod, University of Iowa, nattida-promyod@uiowa.edu
Soonhye Park, University of Iowa

Using Reflective Inquiry to Uncover Perceptions and Beliefs about Transforming Instructional Practice
Robbie L. Higdon, Clemson University, rhigdon@clemson.edu

Pathways to Science Teaching and Curriculum Development: A Self-Study of Two Teachers’ Experiences
Megan Leider, Loyola University Chicago/St. Rita HS, mgeanleider@gmail.com
Elizabeth Coleman, Loyola University Chicago

Developing Reflective Practitioners in Video Centered Communities of Practice (VCCOP)
Kimberly Lebak, Richard Stockton College of New Jersey, kimberlylebak@stockton.edu
Ron Tinsley, Richard Stockton College of New Jersey

Strand 10: Curriculum, Evaluation, and Assessment
Studies on Assessment Forms and Item Sequencing Effects
10:15am – 11:45am, Room 308

Comparing Student Performances, Anxieties, and Preferences between Situated, Virtual Environment Assessments and Multiple-Choice Assessments
Angela Shelton, Temple University, angi@temple.edu
Diane J. Ketelhut, University of Maryland

Concurrent Session #12
1:00pm – 2:30pm

Presidential Sponsored SessionSymposium - The PISA Assessment Framework for Science in 2015
1:00pm – 2:30pm, Room 313

Presider:
Sharon Lynch, George Washington University

Presenter:
Jonathan F. Osborne, Stanford, osbornej@stanford.edu

The Impact of Blended Cyberlearning about Climate Change on Students and Teachers
Cindy L. Kern, University of Nevada, Las Vegas, kermc2@unlv.nevada.edu
Kent J. Crippen, University of Florida
Heather J. Skaza, University of Nevada-Las Vegas
Peter G. Schrader, University of Nevada, Las Vegas
Nya Berry, Clark County School District
Jake Rollans, Clark County School District

Item Sequencing Effects on the Measurement of Students’ Biological Knowledge
Meghan A. Rector, The Ohio State University, rector.43@buckeyemail.osu.edu
Dennis Pearl, The Ohio State University
Ross H. Nehm, The Ohio State University

Strand 11: Cultural, Social, and Gender Issues
Symposium - Promoting Science among English Language Learners (P-SELL) Efficacy Study
10:15am – 11:45am, Grand Ballroom V-B
Presider:
Okhee Lee, University of Miami

Discussant:
Sherry A. Southerland, Florida State University

Presenters:
Jaime Maerten-Rivera, University of Miami
Kimberly S. Lanier, University of Miami
Brandon S. Diamond, University of Miami
Rose Elizabeth Rohrer, University of Miami
Georgia O. Lindskoog, University of Miami
Soyeon Ahn, University of Miami

Lunch—On Your Own
12:00pm – 1:00pm
Presidential Sponsored Session
Poster Symposium - Sandra K. Abell Institute for Doctoral Students Poster Symposium
1:00pm – 2:30pm, Grand Ballroom V-A

Presider:
Janet Carlson, BSCS

Students’ Learning from Deliberative Communications in Socio-Scientific Issues
Birgitta Berne, University of Gothenburg Sweden, birgitta.berne@ped.gu.se

Identification of Science Literacy Practices in Pre-Service and Practicing Teachers for Urban Youth
Anna E. Hutchinson, University of Cincinnati, hutchiae@mail.uc.edu

From Evaluation to Instructional Support: Changes in Secondary Science Preservice Teachers’ Assessment Expertise
Edward G. Lyon, University of California, Santa Cruz, egeaney@ucsc.edu

How do Elementary Teachers and Students with Known NOS Views Make Meaning of NOS Messages in Trade Books?
Seema Rivera, State University of New York (SUNY) Albany, emailseema@gmail.com

From “Teaching the Textbook” to Focusing on ”Big Ideas” in an Introductory Undergraduate Biology Course
Masha Tsaushu, Technion-Israel Institute of Technology; tmasha@gmail.com
Tali Tal, Technion-Israel Institute of Technology
Shimon Gepstein, Technion-Israel Institute of Technology

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

Investigating Teacher Beliefs about the Importance of Scientific Models through Professional Development
Christopher Bogiages, University of South Carolina, cbogiages@gmail.com
Christine R. Lotter, University of South Carolina

Cultural Relevance in High School Biology - Exploring Students’ Scientific Understandings and Dispositions
Julie Brown, University of Florida, brownjc@ufl.edu

Teaching Science to English Learners: A Case Study of an Experienced Science Educator
Joseph Chee, UC Santa Cruz, jchee1@ucsc.edu

Youth Action Research in the Science Classroom: Implications for Youth’s Identity Work
Elizabeth Coleman, Loyola University Chicago, ecoleman3@luc.edu

Alternatively Certified Science Teachers’ Perceptions of their Preparedness to Teach Urban Minority Students
Patricia S. Dunac, Georgia State University, pdunac1@student.gsu.edu

Exploration of Professional Learning Pathways of Senior Years Science Teachers: the Journey toward Science Literacy
Nancy Grant, University of Manitoba, grantnm@mts.net

Leveraging Students’ Lived Experiences and Science Ideas
Sara Hagenah, University of Washington, shagenah@uw.edu

Teacher Candidates’ Storied Identities and Their Learning to Become a Science Teacher
Amal Iboukt, Michigan State University, ibourkami@msu.edu

Pre-service High School Science Teachers’ Selection and Implementation of Formative Assessment Tasks (FATs)
Kemal Izci, University of Missouri-Columbia, kikrc@mail.missouri.edu

What Meanings do Rural Students Place on STEM Careers when Exploring and Creating Career Videos?
Meredith Kier, North Carolina State University, meredith_kier@ncsu.edu
Margaret R. Blanchard, North Carolina State University

Pedagogical Content Knowledge and Content Knowledge of Pre-Service and In-Service Secondary Physics Teachers
Sophie Kirschner, University Duisburg-Essen, sophie.kirschner@uni-due.de
Andreas Borowski, RWTH Aachen University
Hans E. Fischer, University of Duisburg-Essen

Modeling Instruction: Success in Dissemination through Teacher Empowerment
May Lee, University of Colorado at Boulder, maylee@colorado.edu
Melissa Dancy, University of Colorado Boulder
Charles Henderson, Western Michigan University
Eric Brewe, Florida International University

Open Inquiry in the Urban Science Classroom
Megan Leider, Loyola University Chicago, meganleider@gmail.com
Insights about Students’ Knowledge of Natural Selection Concepts from Three High School Biology Teachers’ Classes
Margaret M. Lucero, University of Texas at Austin, mmlucero@mail.utexas.edu

The Fundamentals of Literacy in Science: Teachers’ Implementation of Literacy Practices in the Science Classroom
Sara C. Heredia, University of Colorado at Boulder, Sara.Heredia@colorado.edu

Understanding the Co-Development of Modeling Practice and Ecological Knowledge
Eve I. Manz, Vanderbilt University, evei.manz@vanderbilt.edu

Studying a Reconceptualized Instructional Model for Secondary Physics Education
Michael Mastroianni, University at Albany, SUNY, mm187487@albany.edu

Figured Worlds as a Lens of Understanding Girls’ Identity in a Kindergarten Science Classroom
Alicia McDyre, Pennsylvania State University, axd252@psu.edu

Barriers to Developing Science Faculty Knowledge for Teaching: Identifying Gaps through Critical Review of the Literature
Deepika Menon, University of Missouri, deepkamenon@mail.mizzou.edu

What do Second Graders Notice? Examining Student Notebooks from a Problem-Based Learning Unit
Eileen Merritt, University of Virginia, egm8e@virginia.edu
Catherine Brighton, University of Virginia
Christine Trinter, University of Virginia
Tonya Moon, University of Virginia
Kristen Whitlock, University of Virginia
Kris Wiley, University of Virginia
Peter Malcolm, University of Virginia

Evolution of a K-5 Teacher Learning Community: Grappling With Ambitious Science Teaching Practices
Mark Merritt, Pennsylvania State University, mdm35@psu.edu
Carla Zembal-Saul, Pennsylvania State University

Supports for Engaging Students’ Argumentation: The Role of Students’ Everyday View and Teachers’ Questioning Scaffold
Ji yeong Mun, Ewha Womans University, Republic of Korea, kslp@ewha.ac
Sung-Won Kim, Woman’s University, Republic of Korea

Above the Fold: Headlining the Engagement of Teen Science News Journalists
Jennifer Hope, University of Missouri-St. Louis, jmghope@gmail.com

Engaging in Pedagogical Reasoning through the Work of Mentoring: A Case Study
Shelly Rodriguez, University of Texas, Shelly.rodriguez@austin.utexas.edu

Desegregating Evolution within the Curriculum: Exploring Changes in Students’ Epistemology and Evolutionary Reasoning
Nancy Rose, Ohio University, nrose@laca.org

Youth Participatory Action Research in Science through a Critical Race Theory Lens
Takumi Sato, Michigan State University, tsato@msu.edu

Argumentation as Collaborative Discourse: Productive Argumentation Moves in Elementary Classrooms
Kari Shutt, University of Washington, shuttik@uw.edu

Changes in Teachers’ Culturally Congruent Instruction Over Three Years in a Professional Development Project
Regina Sievert, Salish Kootenai College, regina.sievert@skc.edu
Joan Lafrance, Mekinak Consulting
Rod Brod, University of Montana-Missoula

Revealing Undergraduates Conceptions of the Nature of Science in Ill-Structured Media Domains
Michele Snyder, University at Albany, michele.snyder@clinton.edu

It’s (Not) Elementary: Experiences of Pre-Service Teachers in Science Classrooms
Jessica Stephenson, Virginia Tech, Jesteph3@vt.edu
George Glasson, Virginia Tech

Using Technology to Transform the Social Structure of the High School Physics Classroom
Ben Van Dusen, University of Colorado, Boulder, Benjamin.VanDusen@Colorado.EDU

Influence of PCK for Teaching Evolution on Student Outcomes In A Non-Majors’ College Course
Emily Walter, University of Missouri, emw2r4@mail.missouri.edu
Patricia Friedrichsen, University of Missouri
**Examining Student Collaboration when Using Web 2.0 Tools to Construct a Group Knowledge Artifact**
Jennifer Weible, Pennsylvania State University, jweible@gmail.com

How School Environments Impact Elementary Science Instruction
Julianne A. Wenner, University of Georgia, jakent@uga.edu

Supporting Secondary Biology Teachers in Their Use of Technology to Teach Genetics
Regina Wragg, University of South Carolina wragg@biol.sc.edu

**Strand 1: Science Learning, Understanding and Conceptual Change**

**Conceptual Understanding and Conceptual Change**
1:00pm – 2:30pm, Room 311

*Presider:*
Shulamit Kapon, Tel Aviv University

The Impact of using a Scaffolded Written Framework on Students’ Conceptual Understanding
Jeong-yoon Jang, University of Iowa, jeongyoon-jang@uiowa.edu
Brian M. Hand, University of Iowa

Epistemic Network Analysis: An Alternative Analysis Technique for Complex STEM Thinking
Cynthia M. D’Angelo, University of Wisconsin – Madison, cmangelo@wisc.edu
Douglas B. Clark, ASU / Vanderbilt
David Williamson Shaffer, University of Wisconsin – Madison

The Role of Metacognition in Students’ Development of Explanatory Ideas of Magnetism
Meng-Fei Cheng, University of Illinois at Urbana-Champaign, mcheng2@illinois.edu
David E. Brown, University of Illinois at Urbana-Champaign

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

**Symposium - Re-imagining Context: Student-Generated Representations as Tools for Reasoning in Science**
1:00pm – 2:30pm, Grand Ballroom VI-A

*Discussant:*
Megan Bang, University of Washington

**Presenters:**
Brian Gravel, Tufts University, brian.gravel@tufts.edu
Kristen B. Wendell, University of Massachusetts Boston
Christopher G. Wright, TERC
Joshua A. Darish, Indiana University
Asmalina Saleh, Indiana University

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

Using Technology for Science Learning
1:00pm – 2:30pm, Room 303

*Presider:*
Josephine Shireen Desouza, Ball State University

Edison Didn’t Work Alone: A Case for Collaboration among Rural Middle School Science Students Using Digital Backpacks
Jennifer J. Mohler-Geary, University of Cincinnati, mogy2001@yahoo.com
Maya Israel, University of Cincinnati

Inquiry-Based Science and Technology Program for Female Middle School Students
Hanna Kim, hkim13@depaul.edu
What Makes for Effective Multimedia Simulations in Science Education? Outcomes from an Effectiveness Study
Catherine E. Milne, New York University, cem4@nyu.edu
Jan Plass, New York University
Bruce Horn, Graduate Center, City University of New York
Trace Jordan, New York University
Ruth Schwartz, New York University
Elizabeth Hayward, New York University

Strand 5: College Science Teaching and Learning
(Grades 13-20)
Visual Representation and Science Learning
1:00pm – 2:30pm, Room 304
**Presider:**
Allison Ritchie, University of Toronto

Subject Matter Content Knowledge and Representation Strategies of Physics Teachers: Biot-Savart Law and Ampère’s Law
Sharareh Majidi, University of Helsinki, sharareh.majidi@helsinki.fi
Terhi Mäntylä, University of Helsinki

Comparing Physical and Virtual Manipulatives for Retention and Preparation for Future Learning of Science Concepts
Amy Rouinfar, Kansas State University, rouinfar@phys.ksu.edu
Adrian C. Madsen, Kansas State University
N. Sanjay Rebello, Kansas State University
Sadhana Puntambekar, University of Wisconsin

Categorizing Students’ Kinds of Mental Representations during Problem Solving of Different Representational Task Formats
Bashirah Ibrahim, Kansas State University, bibrahim@phys.ksu.edu
N. Sanjay Rebello, Kansas State University

Using Student Learning Preferences to Specifically Augment Student Performance in an Introductory Biology Laboratory Course
Martin G. Kelly, D’Youville College, Buffalo, NY, martink@dyc.edu

Strand 6: Science Learning in Informal Contexts
Community Involvement in Science: Youth and Adults Participating in Scientific Practices
1:00pm – 2:30pm, Room 305
**Presider:**
Rita Hagevik, The University of North Carolina at Pembroke

Community Science Experts: Putting Place at the Center
Daniel Birmingham, Michigan State University, birmingham2@msu.edu
Angela Calabrese Barton, Michigan State University

Getting Participants to Participate: Stimulating Interest and Unvolvement among Participants in a Citizen Science Initiative
Jennifer Borland, Rockman Et Al, jennifer@rockman.com
Aaron Price, AAWSO

Community Youth as Socioscientific Activists: Visions for School Science Reform
John L. Bence, OISE, University of Toronto, larrybence@utoronto.ca
G. Michael Bowen, Mount Saint Vincent University
Shaun Chen, University of Toronto
Allison Ritchie, University of Toronto
Erin R. Sperling, OISE, University of Toronto

Scientific Competencies and Learning in Online Discourse of a Citizen Science Project
Aaron Price, AAWSO, aaronp@aaawso.org
Hee-Sun Lee, University of California, Berkeley
Jennifer Borland, Rockman Et Al

Strand 7: Pre-service Science Teacher Education
Secondary Science Teacher Preparation
1:00pm – 2:30pm, Room 306
**Presider:**
Christiana Nkechi Omoifo, University of Benin

The Mechanisms of Secondary Science Teacher Candidates’ Learning to Teach
Hosun Kang, University of Washington, hosunk@uw.edu
Charles W. Anderson, Michigan State University

Preservice Secondary Science Teachers’ Approaches to Teaching Inquiry Skills
Byoung Sug Kim, Roosevelt University, bkim@roosevelt.edu
Yeon-A Son, Dankook University
Eun Kyung Ko, National-Louis University
Seok Jun Hong, Dankook University

Preservice Secondary Science Teachers’ Views on the Value and Role of Student Ideas
Douglas B. Larkin, Montclair State University, larkin@dmail.montclair.edu

An Investigation of Secondary Science Teacher Candidates Discourse in the Context of Inquiry Investigations
Danielle E. Dani, Ohio University, dani@ohio.edu
Helen M. Meyer, University of Cincinnati
Strand 7: Pre-service Science Teacher Education
Topics in Environmental Education
1:00pm – 2:30pm, Room 312
Presider:
Julie Thomas, Oklahoma State University

Cosmologies of Preservice Teachers: A Six-Year Study, With Comparisons to Cosmologies of Children
Alice (Jill) A. Black, Missouri State University, ablack@missouristate.edu

The Western Worldview vs. Environmental Education: Pre-service Teachers’ Beliefs
Darren D. Hoeg, University of Toronto, hoeg_darren@hotmail.com
Sarah Barrett, York University

Strand 9: Reflective Practice
Enhancing Students’ Understanding and Empowerment
1:00pm – 2:30pm, Room 301
Presider:
Kim Charmatz, Daemen College

Using an Understanding of Children for Science Lesson Design
Jenny D. Ingber, Bank Street College of Education, jingber@bankstreet.edu
Margaret A. McNamara, Bank Street College of Education

A Self-Study on Reframing Non-Science Majors’ Fundamental Understandings about Scientific Inquiry and Scientists
Gayle A. Buck, Indiana University Bloomington, gabuck@indiana.edu
Xinying Yin, Indiana University Bloomington
Pazit Koren, Hebrew University
Varda Bar, Hebrew University

Building Bridges across the Borders: Elementary Student Conceptions of Science
Erin A. Hashimoto-Martell, Boston College/Boston Public Schools, hashimer@bc.edu

Environmental Action Projects: Exploring Community Partnerships and College Student Empowerment through Participatory Action Research
Kim Charmatz, Daemen College, kcharmat@daemen.edu

Strand 10: Curriculum, Evaluation, and Assessment
Inquiry Instruction and Curriculum
1:00pm – 2:30pm, Room 308
Presider:
Mehmet Aydeniz, The University of Tennessee

A Comparative Analysis of K-12 Assessment Instruments of Students’ Understandings about Scientific Inquiry
Darin S. Munsell, Illinois Institute of Technology, munsdar@hawk.iit.edu
Norman G. Lederman, Illinois Institute of Technology

Comparative Interactions of High School Biology Students Engaging Textbook Accounts and Narratives of Historical Experiments
Matthew Kloser, Stanford University, mkllover@stanford.edu

The Inclusion of the Main Features of Inquiry in Saudi 10th Grade Physics Textbooks
Abdulaziz H. Alolah, King Saud University, Saudi Arabia, a.m.alolah2@yahoo.com
Fahad S. Alshaya, King Saud University, Saudi Arabia
Saeed M. Alshamrani, King Saud University, Saudi Arabia

How do we do Inquiry? Let us Count the Ways
Daniel Z. Meyer, Illinois Institute of Technology, meyerd@iit.edu
Joy Kubarek-Sandor, Illinois Institute of Technology
Cheryl Heitzman, Illinois Institute of Technology
Yaozhen Pan, Illinois Institute of Technology
Sima Faik, Illinois Institute of Technology
Translation and Validation of the Epistemological Beliefs Scale with Preservice Teachers
Yusuf Sulun, Mugla University, syusuf@mu.edu.tr
Aylin Cam, Mugla University
Mustafa S. Topcu, Mugla University
Gokhan Guven, Mugla University
Sertac Arabacioglu, Mugla University

Factors Affecting Primary Science Teachers’ Enactment of Formative Assessment: Reality and Professional Decision Making
Poh Hiang Tan, National Institute of Education, pohhiang.tan@nie.edu.sg

Strand 11: Cultural, Social, and Gender Issues
Symposium - Science Education for Diversity: An International Perspective
1:00pm – 2:30pm, Grand Ballroom V-B
Discussant: Sibel Erduran, University of Bristol

Presenters:
Saouma B. Boujaoude, American University of Beirut, Lebanon, boujaoude@aub.edu.lb
Rola Khishfie, American University of Beirut, Lebanon
Suga Churuwala, Homi Bhabha Centre for Science Education, India
SweeChin Ng, Tunku Abdul Rahman College, Malaysia
Ralf van Griethuijsen, Eindhoven University of Technology, The Netherlands
Ayse Savran Gencer, Pamukkale University
Huseyin Bag, Pamukkale University
Nasser Mansour, Exeter University, UK
Sahar Alameh, American University of Beirut
Michiel van Eijck, Eindhoven University of Technology, The Netherlands
SiewChee Choy, Tunku Abdul Rahman College, Malaysia

Strand 14: Environmental Education
Poster Symposium - Climate Change Education for the Twenty-First Century
1:00pm – 2:30pm, Grand Ballroom VI-B
Presider: Devarati Bhattacharya, University of Minnesota

Collaborative Development of a climate change curriculum for classrooms in the Intermountain west-The ICE-Net Project
Anne Kern, University of Idaho, akern@uidaho.edu

Global Climate Change Education: Advancing Student Knowledge through Teacher Education-The ASK Florida Project
Anna Lewis, University of South Florida, arlewis@csl.usf.edu

CYCLES: Teachers Discovering Climate Change from a Native Perspective
Gillian Roehrig, University of Minnesota, roehr013@umn.edu

Global Climate Change for Teachers: An Online Professional Development Leading to Civic Engagement
Presenter: Julie Thomas, Oklahoma State University, julie.thomas@okstate.edu

Date Enhanced Investigations for Climate Change Education-The DICCE Project
Daniel Zalles, SRI International, daniel.zalles@sri.com
NCAR Research Experience for Teachers (RETI)

2010-2012 NASA Challenger Center Global Climate Change Award
Annette Brickley, Challenger Center for Space Science Education, abrickley@clcofme.org

Global Climate Change Education: Research Experiences, Teaching and Learning
Mary Margaret Small, Clarkson University, mmsmall@clarkson.edu

Improvements to AMS Pre-college Programs: Results of a Self-study on Datastreme Earth’s Climate System
James Brey, American Meteorological Society, brey@ametsoc.org

An Experimental Approach to Climate Change Professional Development
Patricia D. Morrell, University of Portland, morel@up.edu
Kari O’Connell, Oregon State University

Bringing Global Climate Change Education to Alabama Classrooms: The Auburn University GCCE Project
Marllin Simon, Auburn University, msimon@physics.auburn.edu

Climate Change Literacy: Analysis of Learning Gains in Formal Education Setting Using a Normed Evaluation Instrument
Carol Mandryk, George Mason University, mandry@gmail.com
Concurrent Session #13  
2:45pm – 4:15pm

Research Committee Sponsored Session
Symposium - Framing Standards: Researching the Development & Implementation of the Next Generation Science Standards
2:45pm – 4:15pm, Grand Ballroom V-A

**Presider:**
Richard Duschl, Penn State University

**Discussants:**
Kathryn Scantlebury, University of Delaware
Janice Earle, National Science Foundation

**Presenters:**
Stephen Pruitt, Achieve, Inc.
Brett Moulding, Utah State, Tidemark Inst.
James Pellegrino, University of Illinois - Chicago

Strand 1: Science Learning, Understanding and Conceptual Change
Symposium - Towards a Learning Progression of Energy Procedures, and Pedagogical Issues to Reposition Literacy in Scientific Literacy
2:45pm – 4:15pm, Room 311

**Presider:**
Reinders H. Duit, Leibniz Institute for Science Education (IPN) Kiel

**Discussant:**
Charles W. Anderson, Michigan State University, andya@msu.edu

**Presenters:**
David L. Fortus, Weizmann Institute of Science
Joseph S. Krajcik, Michigan State University
Xiufeng Liu, State University of New York At Buffalo (SUNY)
Knut Neumann, Leibniz Institute for Science Education (IPN) Kiel

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Diverse Learners
2:45pm – 4:15pm, Room 302

**Presider:**
Janell Nicole Catlin, Teachers College, Columbia University

The Construction of Inquiry Questions in Project-based Small-group Scientific Inquiry
Jane J. Lee, Seoul National University, jane8207@gmail.com
Heui-Baik Kim, Seoul National University

Factors Affecting whether Students in England Choose to Study Physics once the Subject is Optional
Tamjid Mujtaba, Institute of Education, University of London, t.mujtaba@ioe.ac.uk
Michael J. Reiss, Institute of Education, University of London

Science in the Inclusive Classroom: Addressing Students’ Needs through a Multi-Dimensional Instructional Environment
Ornit Spektor-Levy, ornitsl@gmail.com, Bar Ilan University
Yafa Gonda-Keren, Bar Ilan University
Merav Yifrach, Bar Ilan University

Promoting a Culture of Learning based on Internal Values in an Introductory Undergraduate Biology Course
Ornit Sagy, Technion-Israel Institute of Technology, ornit_sagy@yahoo.com
Yael Kali, University of Haifa
Masha Tsaxush, Technion-Israel Institute of Technology
Tali Tal, Technion-Israel Institute of Technology
Dan Zilberstein, Technion-Israel Institute of Technology
Shimon Gepstein, Technion-Israel Institute of Technology

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies
Measuring and Exploring Teachers’ PCK
2:45pm – 4:15pm, Room 303

**Presider:**
Isha DeCoito, York University

Teacher Knowledge versus Teacher Practice: Reflecting on Classroom Instruction and Interaction through PCK-directed Observation
Erik Barendsen, Radboud University Nijmegen, ILS-RU, e.barendsen@ils.ru.nl
Ineke Henze, Radboud University, Nijmegen

Further Examination of Interplay between Pedagogical Content Knowledge Components
Sevgi Aydin, Yuzuncu Yil University, sevgi.aydin45@hotmail.com
Yezdan Boz, Middle East Technical University

Comparison of Experienced Chemistry Teachers’ Pedagogical Content Knowledge in Electrochemistry and Radioactivity
Yezdan Boz, Middle East Technical University, yezdan@metu.edu.tr
Sevgi Aydin, Yuzuncu Yil University

Examine The Discourse Pattern And Teacher’s Pedagogies In Promotion Reasoning In Science Writing Heuristic Classroom
Niphon Chanlen, University of Iowa, niphon-chanlen@uiowa.edu
Brian M. Hand, University of Iowa
Measuring PCK for Teaching Chemical Equilibrium: A Comparison between Experienced Teachers and Pre-service Teachers
Marissa S. Rollnick, Wits University, marissa.rollnick@wits.ac.za
Elizabeth M. Mavhunga, Wits University

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies
Teacher Beliefs and Effects on Practice
2:45pm – 4:15pm, Room 305
Presider:
Catherine E. Milne, New York University

Relationship between Teachers’ Beliefs and Practice of Review Lesson and Student Learning
Su Gao, University of Nevada, Las Vegas, gaos2@unlv.nevada.edu
Jian Wang, University of Nevada, Las Vegas

Teachers Views of the Role of Literacy in Science
Jonathan F. Osborne, Stanford University, osborne@stanford.edu
Michael Metz, Stanford University
Alexis Patterson, Stanford University
Diego Xavier Roman, Stanford University

Pre-service Science Teachers’ Orientations toward Teaching: Evidence for Constancy and Ability across Subject Matter Knowledge Areas
Vanessa Kind, Durham University, UK, vanessa.kind@durham.ac.uk

Science Teachers’ Beliefs about the Influence of their Summer Research Experiences on their Pedagogical Strategies
Rommel Miranda, Towson University, Rmiranda@towson.edu
Julie Damico, Towson University

Secondary Science Teacher Beliefs about Talk during Whole-Class Discussions
Diane Silva Pimentel, Boston College, silvadi@bc.edu
Katherine L. McNell, Boston College

Strand 5: College Science Teaching and Learning (Grades 13-20)
Science and Graphic Representations
2:45pm – 4:15pm, Room 304

Investigating the Value of Multi Modal Representation Instruction on Learning Physics Concepts
Murat Gunel, Ahi Evran University, mgunel@ahievran.edu.tr
Cuneyt Ulu, Marmara University

Understanding the Conventions Undergraduate Students Follow or Break When Constructing Scales for Graphs
Margaret M. Lucero, The University of Texas at Austin, mmlucero@mail.utexas.edu
Cesar Delgado, The University of Texas at Austin

Students’ Use of Covalent Bond Model to Represent Ionic Bonds: Insights from Particulate Drawing Task
Abdi M. Warfa, University of Minnesota, moham489@umn.edu
James M. Nyachwaya, University of Minnesota
Gillian Roehrig, University of Minnesota
Jamie L. Schneider, University of Wisconsin River Falls

Using Diagrams in Conjunction with Clicker-questions in Large Lecture Biology Courses to Enhance Student Learning
Johanna M. Fitzgerald, UMass-Amherst, johfitz@yahoo.com
J.Z. Barlow, UMass-Amherst
Randall Phillis, UMass-Amherst

Strand 7: Pre-service Science Teacher Education
Preservice Teachers’ Understandings and Perceptions of the Nature of Science
2:45pm – 4:15pm, Room 306
Presider:
G. Michael Bowen, Mount Saint Vincent University

A Case Study of a Pre-Service Science Teacher’s Practice of NOS Teaching and Argumentation
Yasemin Ozdem, Gaziosmanpasa University, yozdem@metu.edu.tr
Kader Biliçan, Ataturk University

Investigating use of Self-efficacy Sources in Improving Preservice Science Teachers’ Self-efficacy Beliefs Regarding Teaching Nature of Science
Kader Biliçan, Ataturk University
Jale Cakiroglu, Middle East Technical University

Assessing Student Learning from a PBL Approach: Comparing Pre-Service Science Teachers to Undergraduate Science Students
Sharon Schleigh, East Carolina University, schleighs@ecu.edu
Alex Manda, East Carolina University
Hilda Bryan, East Carolina University
Strand 7: Pre-service Science Teacher Education
Developing Pre-Service ‘Teachers’ Content Knowledge
2:45pm – 4:15pm, Room 312
**Presider:**
Douglas B. Larkin, Montclair State University

Examining the Role of Content Knowledge in Learning to Teach Science: Implications for Teacher Preparation
Gail Richmond, Michigan State University, gailr@msu.edu

Exploring the Teacher-Researcher Model for Impacts on Pre-service Teachers’ Preparation for Science and Math Teaching
Bryan M. Rebar, California Polytechnic State University, brebar@calpoly.edu
John M. Keller, California Polytechnic State University
Collie Conoley, University of California, Santa Barbara

Science Student Teachers’ Struggles with and Learning about Classroom Action Research During Their Field Experiences
Chatree Falkhamta, Kesetsart University, chatreechem@yahoo.com
Anthony Clarke, University of British Columbia

Strand 8: In-service Science Teacher Education
Promoting Project-Based Science Teaching
2:45pm – 4:15pm, Room 206
**Presider:**
Christine R. Lotter, University of South Carolina

The Impact of an Immersion Course on In-Service K-8 Teachers Implementation of Reformed Teaching Practices in the Classroom
Margaret D. Nolan, Boston University, noland@mersd.org
Peter Garlik, Boston University
Charles Winrich, Boston University
Nicholas Gross, Boston University

Developing Science Teacher Leaders to Facilitate the Implementation of Project-Based Science in Schools: Preliminary Findings
Gale A. Mentzer, Grant Fundamentals LLC, gale@grantfundamentals.com
Janet Struble, The University of Toledo

Educative Curriculum Materials that Allow for Learned Adaptations: Ensuring Quality of Implementation
Barbara Hug, University of Illinois at Urbana-Champaign, bhug@illinois.edu
Tania Jarosewich, Censeo Group LLC
Donna Koral, University of Illinois at Urbana-Champaign

Strand 10: Curriculum, Evaluation, and Assessment
Assessment and Evaluation
2:45pm – 4:15pm, Room 308
**Presider:**
Alan K. Szeto, Purdue University Calumet

Effect of Order of Concept Introduction on Secondary Honors Students’ Understanding of Chemistry
John C. Scali, University of Delaware, Newark, john.scali@bsclk12.de.us

Research-Based Shift from Algorithmic Teaching to ‘HOCS Learning’ Science - for a Diverse Global Community
Uri Zoller, Haifa University, uriz@research.haifa.ac.il
Naji Kortam, Haifa University
Tami Levy Nahum, Haifa University
Ibtesam Azaiza, Haifa University
David Ben-Chaim, Haifa University

Where are the People? Understanding Representations of Society-Nature Relationships in State Science Standards in United States
Ajay Sharma, University of Georgia, ajay@uga.edu
Cory A. Buxton, University of Georgia

Designing Effective Science Achievement Measures for Intervention Studies with English Language Learners
Jerome M. Shaw, University of California, Santa Cruz, jmlshaw@uucsc.edu
Edward G. Lyon, University of California, Santa Cruz
Joseph Chee, University of California, Santa Cruz

NARST Executive Board Meeting #3
5:00pm – 10:00pm, Grand Ballroom 7
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.
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).
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Dennis Sunal, Donna Turner, and Cynthia Sunal, University of Alabama; Dean Zollman, Kansas State University; and Cheryl Mason, San Diego State University are conference committee co-chairs.

For more information contact Dennis Sunal at dwsunal@bama.ua.edu

*The Conference is partially funded under the National Science Foundation Grant TPC 0554594. The project focuses on an examination of teaching in undergraduate science in the US and its impact on students. Opinions expressed in conference reports are those of the authors and do not necessarily reflect those of the Foundation.