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Edited by John K Gilbert, Institute of Education, University of Reading, UK

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ACKNOWLEDGMENTS

The following members of the Program Committee helped in preparing and editing the 2010 NARST Annual International Conference Program Book.

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Dana L. Zeidler, President-Elect
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 (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.

How NARST Keeps Its Members Informed

- 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.
- 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 2010 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 2010 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 2010 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) trifold 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 NARST 2010 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.

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.
• 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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A Special Thanks to our Sponsors and Exhibitors  
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2011 NARST Annual International Conference

The Program Chair invites NARST members and others to plan to participate in the 2011 NARST Annual International Conference and especially urges all members to start planning program proposals now during this year’s conference.

VENUE: Caribe Royale All-Suite Hotel & Convention Center, 8101 World Center Drive, Orlando, FL 32821 USA
THEME: Global Sustainability and Public Understanding of Science: The Role of Science Education Research in the International Community
DATES: Saturday, April 2 – Wednesday, April 6, 2011

SUBMISSION DEADLINE: The Program Chair or designate must receive your program proposals for the 2011 Annual International Conference by August 15, 2010. The deadline allows sufficient time for processing, reviewing and evaluating the many proposals. The original call for proposals will appear on the NARST website in June 2010.

2011 MEETING BACKGROUND INFORMATION: The 2011 NARST meeting will be at the Caribe Royale All-Suite Hotel & Conference Center. Nestled on 53 lush, tropical acres, the Caribe Royale offers its guests spacious, well-appointed one-bedroom suites, luxurious two-bedroom lakeside villas and a wealth of desirable hotel amenities all conveniently located near Orlando’s most popular attractions. While famous for its theme parks, Orlando, Florida, includes the areas of Kissimmee and Lake Buena Vista. Visitors looking for respite from typical tourist attractions can explore museums, malls, state parks, golf courses, unique dining options and nearby small towns.

Next Stop Orlando - see you in the Sunshine State!
Dana L. Zeidler, President-Elect

Future Meeting Dates for NARST, NSTA, and AERA

2011
| NSTA     | San Francisco March 9 – 12 |
| AERA     | New Orleans April 8 – 12 |
| NARST    | Orlando April 2 – 6 |

2012
| NSTA     | Indianapolis March 29 – April 1 |
| AERA     | Vancouver April 13 – 17 |
| NARST    | Indianapolis March 24 – 28 |

2013
| NSTA     | San Antonio April 11 - 14 |
| AERA     | TBD |
| NARST    | TBD |
2009-10 Strand Coordinators

STRAND 1  Science Learning, Understanding, and Conceptual Change  
Eric Wiebe, Julia Plummer

STRAND 2  Science Learning: Contexts, Characteristics, and Interactions  
Erin Dolan, Jennifer Eklund

STRAND 3  Science Teaching –Primary School (Grades preK-6)  
Terry Shanahan, Meredith Park Rogers

STRAND 4  Science Teaching –Secondary School (Grades 5-12)  
Helen Meyer, Danielle Dani

STRAND 5  College Science Teaching (Grades 13-20)  
Tahsin Khalid, Sanjay Rebello

STRAND 6  Science Learning in Informal Contexts  
Jim Kisiel, John Falk

STRAND 7  Pre-service Science Teacher Education  
Amelia Wenk-Gotwals, Kristin Gunckel

STRAND 8  In-service Science Teacher Education  
Kimberly Fluet, Daniel Meyer

STRAND 9  Reflective Practice  
Erin Peters, Tom McConnell

STRAND 10  Curriculum, Evaluation, and Assessment  
Xiufeng Liu, Joe Engemann

STRAND 11  Cultural, Social, and Gender Issues  
Bhaskar Upadhyay, Maria Rivera

STRAND 12  Educational Technology  
Hee-Sun Lee, Keisha Varma

STRAND 13  History, Philosophy, and Sociology of Science  
Reneé Schwartz, Sherry Southerland

STRAND 14  Environmental Education  
Rita Anne Hagevik, Teddie Phillipson-Mower

STRAND 15  Policy  
Sharon Lynch, Sarah Carrier
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2007 Jonathan Osborne  
2008 Penny J. Gilmer  
2009 Charlene M. Czerniak  
2010 Richard A. Duschl
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(NARST created the position of Executive Secretary in 1975; the title was changed to Executive Director in 2003)

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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 – 2012

JRST Editors

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David P. Butts 1975 – 1979
James A. Shymansky 1980 – 1984
Ron Good 1990 – 1993
Charles A. Anderson & James J. Gallagher August 1999 – 2001
J. Randy McGinnis and Angelo Collins 2006- 2010
Joseph Krajcik and Angela Calabrese Barton 2011 – 2015

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Wayne Welch
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NARST Award Winners

Distinguished Contributions to Science Education Through Research

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

- 1986 Anton E. Lawson
- 1987 Paul DeHart Hurd
- 1988 John W. Renner
- 1989 Willard Jacobson
- 1990 Joseph D. Novak
- 1991 Robert L. Shrigley
- 1992 Pinchas Tamir
- 1993 Jack Easley, Jr.
- 1994 Marcia C. Linn
- 1995 Wayne W. Welch
- 1996 Carl F. Berger
- 1997 Rosalind Driver
- 1998 James J. Gallagher
- 1999 Peter J. Fensham
- 2000 Jane Butler Kahle
- 2001 John K. Gilbert
- 2002 Audrey B. Champagne
- 2003 Barry J. Fraser
- 2004 Robert E. Yager
- 2005 Joseph Krajcik

JRST Award

The JRST Award is given annually to 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>
<th>Year</th>
<th>Awardee</th>
<th>Year</th>
<th>Awardee</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>Mary Budd Rowe</td>
<td>1989</td>
<td>Glen S. Aikenhead, Anton E. Lawson</td>
<td>2002</td>
<td>Andrew Gibert and Randy Yerrick</td>
</tr>
<tr>
<td>(tie)</td>
<td>F. David Boulanger</td>
<td>1995</td>
<td>Stephen P. Norris and Linda M. Phillips</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1985</td>
<td>Julie P. Sanford</td>
<td>1998</td>
<td>Allan G. Harrison, J. Grayson, and David F. Treagust</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Outstanding Paper Award**

The Outstanding Paper Award is given annually for the paper or research report presented at the 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>
<tr>
<td>1985</td>
<td>Hanna J. Arzi, Ruth Ben-Zvi, and Uri Ganiel</td>
</tr>
<tr>
<td>(tie)</td>
<td>Russell H. Yeany, Kueh Chin Yap, and Michael J. Padilla</td>
</tr>
<tr>
<td>1986</td>
<td>Barry J. Fraser, Herbert J. Walberg, and Wayne W. Welch (tie)</td>
</tr>
<tr>
<td>1987</td>
<td>Robert D. Sherwood</td>
</tr>
<tr>
<td>1988</td>
<td>Barry J. Fraser and Kenneth G. Tobin</td>
</tr>
<tr>
<td>1989</td>
<td>James J. Gallagher and Armando Contreras</td>
</tr>
<tr>
<td>1990</td>
<td>Patricia L. Hauslein, Ronald G. Good, and Catherine Cummins</td>
</tr>
<tr>
<td>1991</td>
<td>Nancy R. Romance and Michael Vitale</td>
</tr>
<tr>
<td>1992</td>
<td>Patricia Heller, Ronald Keith and Scott Anderson</td>
</tr>
<tr>
<td>1993</td>
<td>Wolff-Michael Roth</td>
</tr>
<tr>
<td>1994</td>
<td>Wolff-Michael Roth and Michael Bowen</td>
</tr>
<tr>
<td>1995</td>
<td>Wolff-Michael Roth</td>
</tr>
<tr>
<td>1996</td>
<td>Nancy J. Allen</td>
</tr>
<tr>
<td>1997</td>
<td>no award</td>
</tr>
<tr>
<td>1998</td>
<td>Wolff-Michael Roth, Reinders Duit, Michael Komorek, and Jens Wilbers</td>
</tr>
<tr>
<td>1999</td>
<td>Lynn A. Bryan</td>
</tr>
<tr>
<td>2000</td>
<td>Joseph L. Hoffman and Joseph S. Krajcik</td>
</tr>
<tr>
<td>2001</td>
<td>Allan G. Harrison</td>
</tr>
<tr>
<td>2002</td>
<td>Carolyn Wallace Keys, Eun-Mi Yang, Brian Hand and Liesl Hohenshell</td>
</tr>
<tr>
<td>2003</td>
<td>Wolff-Michael Roth</td>
</tr>
<tr>
<td>2004</td>
<td>Joanne K. Olson, Sharon J. Lynch, Joel Kuipers, Curtis Pyke and Michael Szesze</td>
</tr>
<tr>
<td>2005</td>
<td>Chi Yan Sui, David Treagust and Michael Szesze</td>
</tr>
<tr>
<td>2006</td>
<td>Leema Kuhn and Brian Reiser</td>
</tr>
<tr>
<td>2008</td>
<td>Guy Ashkenazi and Lana Tockus-Rappoport</td>
</tr>
<tr>
<td>2009</td>
<td>Jrène Rahm</td>
</tr>
<tr>
<td>2010</td>
<td>Mark W. Winslow, John R. Staver, and Lawrence C. Sharmann</td>
</tr>
</tbody>
</table>
Outstanding Doctoral Dissertation Award

This award was established in 1992 to be given annually for the Doctoral Dissertation judged to have the greatest significance in the field of science education.

<table>
<thead>
<tr>
<th>Year</th>
<th>Awardee</th>
<th>Major Professor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>René Stofflet</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. Carlsen</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-Khalick</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 Krajeck</td>
</tr>
<tr>
<td>2004</td>
<td>David L. Fortus</td>
<td>Ronald Marx and Joseph Krajeck</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. Krajeck</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>
</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>Renee 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 Khishfe</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>

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 educational research. 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>
<th>Year</th>
<th>Awardee</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>Wolff-Michael Roth</td>
<td>2000</td>
<td>Angela Calabrese Barton</td>
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<tr>
<td>1994</td>
<td>Deborah J. Tippins</td>
<td>2001</td>
<td>Julie A. Bianchini</td>
</tr>
<tr>
<td>1995</td>
<td>Nancy B. Songer</td>
<td>2002</td>
<td>Alan G. Harrison</td>
</tr>
<tr>
<td>1996</td>
<td>Mary B. Nakhle</td>
<td>2003</td>
<td>Fouad Abd-El-Khalick</td>
</tr>
<tr>
<td>1997</td>
<td>Peter C. Taylor</td>
<td>2004</td>
<td>Grady J. Venville</td>
</tr>
<tr>
<td>1998</td>
<td>J. Randy McGinnis</td>
<td>2005</td>
<td>Randy L. Bell</td>
</tr>
<tr>
<td>1999</td>
<td>Craig W. Bowen</td>
<td>2006</td>
<td>Heidi Carlone</td>
</tr>
<tr>
<td></td>
<td>Gregory J. Kelly</td>
<td>2007</td>
<td>Bryan A. Brown</td>
</tr>
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<td></td>
<td></td>
<td>2008</td>
<td>Hsin-Kai Wu</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2009</td>
<td>Troy D. Sadler</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2010</td>
<td>Thomas Tretter</td>
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</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 Annual Meeting 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>
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<tbody>
<tr>
<td>1980</td>
<td>Livingston S. Schneider and John W. Renner</td>
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<tr>
<td></td>
<td>Heidi Kass and Allan Griffiths</td>
</tr>
<tr>
<td></td>
<td>Ramona Saunders and Russell H. Yeany</td>
</tr>
<tr>
<td></td>
<td>Joe Long, James R. Okey, and Russell H. Yeany</td>
</tr>
<tr>
<td></td>
<td>M. James Kozlow and Arthur L. White</td>
</tr>
<tr>
<td>1981</td>
<td>Dorothy L. Gabel, Robert D. Sherwood, and Larry G. Enochs</td>
</tr>
<tr>
<td></td>
<td>Wayne Welch, Ronald D. Anderson, and Harold Pratt</td>
</tr>
<tr>
<td></td>
<td>Mary Ellen Quinn and Carolyn Kessler</td>
</tr>
<tr>
<td></td>
<td>P. Ann Miller and Russell H. Yeany</td>
</tr>
<tr>
<td>1982</td>
<td>Louise L. Gann and Seymour Fowler</td>
</tr>
<tr>
<td></td>
<td>Dorothy L. Gabel and Robert D. Sherwood</td>
</tr>
<tr>
<td></td>
<td>Thomas L. Russell</td>
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<tr>
<td></td>
<td>Joseph C. Cotham</td>
</tr>
<tr>
<td>1983</td>
<td>Robert D. Sherwood, Larry G. Enochs, and Dorothy L. Gabel</td>
</tr>
<tr>
<td>1984</td>
<td>Mary Westerback, Clemencia Gonzales, and Louis H. Primavera</td>
</tr>
<tr>
<td></td>
<td>Kenneth G. Tobin</td>
</tr>
<tr>
<td></td>
<td>Hanna J. Arzi, Ruth Ben-Zvi, and Uri Ganiel</td>
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<tr>
<td></td>
<td>Charles Porter and Russell H. Yeany</td>
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<tr>
<td>1985</td>
<td>Dan L. McKenzie and Michael J. Padilla</td>
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<tr>
<td></td>
<td>Margaret Walkosz and Russell H. Yeany</td>
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<tr>
<td></td>
<td>Kevin C. Wise and James R. Okey</td>
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<tr>
<td>1986</td>
<td>Sarath Chandran, David F. Treagust, and Kenneth G. Tobin</td>
</tr>
<tr>
<td></td>
<td>Darrell L. Fisher and Barry J. Fraser</td>
</tr>
<tr>
<td></td>
<td>Dorothy L. Gabel, Stanley L. Helgeson, Joseph D. Novak, John Butzow, and V. K. Samuel</td>
</tr>
<tr>
<td></td>
<td>Linda Cronin, Meghan Tweist, and Michael J. Padilla</td>
</tr>
<tr>
<td>1988</td>
<td>Uri Zoller and Benn Chaim</td>
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<tr>
<td>1989</td>
<td>James D. Ellis and Paul J. Kuerbis</td>
</tr>
<tr>
<td>1990</td>
<td>Dale R. Baker, Michael D. Piburn, and Dale S. Niederhauser</td>
</tr>
<tr>
<td>1991</td>
<td>David F. Jackson, Billie Jean Edwards, and Carl F. Berger</td>
</tr>
</tbody>
</table>
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2009-2010

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Executive Director: Bill Kyle bill_kyle@umsl.edu
Awards Committee Chair: Phil Scott P.H.Scott@education.leeds.ac.uk

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(12) Nancy Romance romance@fau.edu

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(10) Meta VanSickle VansickleM@cofc.edu
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(11) Nancy Romance romance@fau.edu
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(12) Anthony Petrosino ajpetrosino@mail.utexas.edu
(12) John Clement clement@educ.umass.edu

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Awards Committee Chair: Phil Scott P.H.Scott@education.leeds.ac.uk

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(12) Julie Bianchini jbianchi@education.ucsb.edu

Members:
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Schedule at a Glance

Saturday, March 20
4:00 PM – 9:00 PM  NARST Executive Board Meeting #1

Sunday, March 21
7:30 AM – 5:00 PM  NARST Executive Board Meeting #2
8:00 AM – 5:00 PM  Registration
1:00 PM – 5:00 PM  Preconference Workshops #1 through #4
5:30 PM – 7:00 PM  Plenary Session # 1: James Spillane, Northwestern University (USA)
7:00 PM – 9:30 PM  Presidential / Welcome Reception (Free appetizers and cash bar)

Monday, March 22
7:00 AM – 8:15 AM  Committee Meetings
8:30 AM – 10:00 AM Concurrent Session # 1
10:00 AM –10:30 AM  Break
10:30 AM – 12:00  Concurrent Session # 2
12:00 – 12:45 PM  NARST Business Meeting (Box lunch provided for 1st 100 attendees who sign up)
1:00 PM – 2:30 PM  Concurrent Session # 3
2:45 PM – 4:15 PM  Concurrent Session # 4
4:30 PM – 6:00 PM  Concurrent Session # 5
6:15 PM – 7:15 PM  Mentor-Mentee Nexus
6:15 PM – 7:15 PM  Graduate Student Forum
7:00 PM – 9:00 PM  JRST Board Meeting and Reception

Tuesday, March 23
7:00 AM – 8:15 AM  Committee Meetings
8:30 AM – 10:00 AM  Plenary Session # 2: Doris Jorde, University of Oslo (Norway)
10:00 AM – 10:30 AM  Break
10:30 AM – 11:45 AM  Concurrent Session # 6 - Poster Time for All Posters
12:00 – 2:00 PM  Awards Luncheon
2:15 PM – 3:45 PM  Concurrent Session # 7
4:00PM – 5:30 PM  Concurrent Session # 8
5:45 PM – 6:45 PM  IJSME Editorial Board Meeting (By invitation only)
5:45 PM – 6:45 PM  New Researcher and Junior Faculty Early Career Discussion
7:00 PM – 9:00 PM  Equity Dinner (off site)
7:30 PM – 10:00 PM  Routledge/Taylor & Francis Reception (Independence Ballroom - By Invitation)

Wednesday, March 24
7:00 AM – 8:15 AM  Strand Meetings
8:30 AM – 10:00 AM  Concurrent Session # 9
10:00 AM –10:30 AM  Break
10:30 AM – 12:00  Concurrent Session # 10
12:00 – 1:00 PM  Lunch on Your Own
1:15 PM – 2:45 PM  Concurrent Session # 11
3:00 PM – 4:30 PM  Concurrent Session # 12
5:30 PM – 10:30 PM  NARST Executive Board Meeting #3
4:00pm - 9:00pm

NARST Executive Board Meeting Session #1
4:00pm – 9:00pm, Franklin 1
NARST Executive Board Meeting Session #2
7:30am – 5:00pm, Conference Rooms 401 – 402

Pre Conference Workshop—Equity and Ethics Committee Sponsored
W1 Research into Practice: Practice Informing Research for Equity Scholarship and Teaching
1:00pm – 5:00pm, Conference Rooms 407 – 408
Felicia M. Moore-Mensah, Columbia University
Melody Russell, Auburn University
Jomo Mutegi, Sankore Institute
Blakely K. Tsurusaki, Washington State University
Gillian U. Bayne, Lehman College
Rowhea Elmesky, Washington University-St. Louis
Wilbert Butler, Tallahassee Community College
Nate Carnes, University of South Carolina
Mary M. Atwater, University of Georgia
Sumi Hagiwara, Montclair State University

Pre Conference Workshop—Research Committee Sponsored
W2 Writing a Competitive Proposal for the National Science Foundation’s (NSF) Division of Research on Learning in formal and Informal Settings (DRL): Strategies and Tips for Novice and Seasoned Proposers
1:00pm – 5:00pm, Conference Rooms 411 – 412
Janice Earle, National Science Foundation
Sharon J. Lynch, National Science Foundation
Gavin Fulmer, National Science Foundation
Charles W. Anderson, Michigan State University
Heidi Carlone, The University of North Carolina at Greensboro
Okhee Lee, University of Miami

Pre Conference Workshop—Research Committee Sponsored
W3 Developing High Quality Reviews for the Journal of Research in Science Teaching
1:00pm – 5:00pm, Conference Rooms 414 – 415
Joseph S. Krajcik, University of Michigan
Angela Calabrese Barton, Michigan State University

Plenary Session
PL1 Policy in Practice: Instruction & the School Administrative Infrastructure
5:30pm – 7:00pm, Liberty Ballroom
Presider:
Richard A. Duschl, Penn State University
Presenter:
James Spillane, Northwestern University

Presidential/Welcome Reception
Social event: All NARST members are welcome—free appetizers and cash bar.
7:00pm – 9:30pm, Salons E and F
Committee Meetings
7:00am – 8:15am
Awards Committee Chairs & Co-Chairs Meeting
7:00am – 8:15am, Conference Room 401
Equity and Ethics Committee Meeting
7:00am – 8:15am, Conference Room 402
External Policy and Relations Committee Meeting
7:00am – 8:15am, Conference Room 403
Research Committee Meeting
7:00am – 8:15am, Conference Room 404
Membership and Election Committee Meeting
7:00am – 8:15am, Conference Room 405
International Committee Meeting
7:00am – 8:15am, Conference Room 406
Program Committee Meeting
7:00am – 8:15am, Conference Room 407
Publications Advisory Committee Meeting
7:00am – 8:15am, Conference Room 408

Concurrent Session #1
8:30am – 10:00am

Strand 1: Science Learning, Understanding and Conceptual Change
S1.1 SC-Paper Set: New Ideas about Learning Progressions
8:30am – 10:00am, Conference Room 401

Presider:
Gavin Fulmer, NSF

S1.1.1 Towards a Learning Progression Addressing the Seasons: A Comparison of Two Learning Trajectories with Middle School Students
Julia D. Plummer, Arcadia University
Lori Agan, Expeditionary Learning School

S1.1.2 Fifth and Eighth Grade Students’ Conceptions about the Nature of Technology
Nicole DiGironimo, University of Delaware

S1.1.3 Progression in Student Understanding of Matter from Middle School to College: Implementation of the Structure and Motion of Matter (SAMM) Survey
Marilyne Stains, University of Massachusetts Boston
Marta Escriu-Sune, University of Massachusetts Boston
Hannah Sevian, University of Massachusetts Boston

S1.1.4 What Progresses in a Learning Progression: A Longitudinal Ground-Truth Study of One Students Understanding of Energy in Ecosystems
Elisabeth Roberts, The University of Arizona
Bruce Johnson, University of Arizona

Strand 2: Science Learning: Contexts, Characteristics and Interactions
S1.2 Poster Symposium: Applying New Mechanisms and Conceptualizations of the “Transfer-of-Learning” to Science Classrooms: The Dynamic Role of Contexts and Interactions
8:30am – 10:00am, Salon C

Discussant: Charles Anderson

S1.2.1 “Preparation for Future Learning” in Physics
Eugenia Etkina, Rutgers University
Anna Karelina, Rutgers University
Maria Ruibal-Villasenor, Rutgers University
Gregory Suran, Rutgers University

S1.2.2 Approaching Conceptual Representations: A Case of Transfer among Middle School Science Teachers
Cindy E. Hmelo-Silver, Rutgers University
Suparna Sinha, Rutgers University
Steven Gray, Rutgers University
Sameer Honwad, Rutgers University
Catherine Eberbach, Rutgers University
Rebecca Jordan, Rutgers University
Spencer Rugaber, Georgia Tech University
Swaroop Vattam, Georgia Tech University
Ashok Goel, Georgia Tech University
Wendy Ford, Linwood Middle School
Casey Schmidt, Linwood Middle School

S1.2.3 Expansive Framing and Transfer in High School Biology Class: Hybridizing Settings and Promoting Connections within a Larger Learning Community
Randi A. Engle, University of California, Berkeley
Xenia S. Meyer, Cornell University
Jim Clark, Arroyo High School
Jillann White, University of California, Berkeley
Adam Mendelson, University of California, Berkeley

S1.2.4 Individual and Group-Level Dynamics of Framing
Luke Conlin, University of Maryland
Ayush Gupta, University of Maryland
David Hammer, University of Maryland
Strand 2: Science Learning: Contexts, Characteristics and Interactions
S1.3 Poster Symposium: Developing the Skills and Practices of Modeling
8:30am – 10:00am, Salon D
Presenters:
Leona Schaulbe, Peabody College, Vanderbilt University
Douglas B. Clark, Peabody College, Vanderbilt University
Richard Lehrer, Peabody College, Vanderbilt University
Eve I. Manz, Peabody College, Vanderbilt University
Christina Schwarz, Michigan State University
Pratim Sengupta, Vanderbilt University
Brian J. Reiser, Northwestern University
Uri Wilensky, Northwestern University
William Sandoval, University of California at Los Angeles

Strand 3: Science Teaching--Primary School
(Grades preK-6): Characteristics and Strategies
S1.5 SC-Paper Set: Teaching Science to ALL Learners
8:30am – 10:00am, Conference Room 403
Presider:
Tara B. O’Neill, University of Hawaii

S1.5.1 Becoming an Inclusive Science Teacher: Exploring the Intersection of Inquiry and Inclusion in the Primary Classroom
Sharon Dorger, Syracuse University
Vicki McQuitty, Davis College
Uzma Khan, Syracuse University

S1.5.2 In Search of what it means to Develop Scientific Literacy in a Primary School
Kathy Smith, Monash University
Amanda K. Berry
John Loughran

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies
S1.6 SC-Paper Set: Barriers to Inquiry-Based Science Teaching
8:30am – 10:00am, Conference Room 404
Presider:
Gale Seiler, McGill University

S1.6.1 Resident Scientists’ Inquiry Instructional Practice and their Perceived Benefits and Difficulties of Inquiry in Schools
Frackson Mumba, Southern Illinois University
William F. Mejia, Southern Illinois University Carbondale
Vivien M. Chabalengula, Southern Illinois University
Erin Wilson-Miles, Southern Illinois University
William Hunter, Illinois State University

S1.6.2 The Lack of Separation between Research Questions and Methods in High School Lab Manuals and Its Effects on Teachers’ Understanding of the Practice of Science
Eilat Hasson, Weizmann Institute of Science
Michal Ben-Nun, Weizmann Institute of Science
Anat Yarden, Weizmann Institute of Science
S1.6.4 Korean Secondary Science Teachers’ Views on Barriers in Implementing Inquiry-Based Instructions
Hyunju Park, Chosun University
Yoonbong Park, Chungnam National University
Jeong-Min Hong, Boseoung High School
Bo-Ram Hyun, Incheon Science High School
Yun-Mi Lee, Jeonnam High School
Ki-Rak Park, Jeonnam Girl’s High School
Hongseok Kim, Dobong High School
Eunmi Park, Seokkwan High School

Strand 5: College Science Teaching and Learning (Grades 13-20)
S1.7 SC-Paper Set: Explanation and Reasoning in Undergraduate Chemistry and Physics
8:30am – 10:00am, Conference Room 405
Presider:
Bridget Brennan, University of Delaware

S1.7.1 Exploring Dominant Types of Explanations Built by General Chemistry Students
Vicente Talanquer, University of Arizona

S1.7.2 Uncovering the Processes by Which Students Form Links between Multiple Modes of Representation In Chemistry
Tosten Haugerud, Western Washington University
Mathew Lockett, Western Washington University

S1.7.3 Investigating Change and Consistency in Introductory College Students’ Understanding about Pulleys
Amy Rouinfar, Florida State University
Jacquelyn J. Chini, Kansas State University
Adrian Carmichael, Kansas State University
Sadhana Puntambekar, University of Wisconsin - Madison
N. Sanjay Rebello, Kansas State University

S1.8 SC-Paper Set: Investigating the Informal-Formal Boundary
8:30am – 10:00am, Conference Room 406
Presider:
Phyllis Katz, Independent

S1.8.1 In What Ways Do Informal—Formal Science Partnerships For Teacher Development Play A Role In Induction, And Retention Of Urban Science Teachers?
Jennifer Adams, Brooklyn College-CUNY
Maritza Macdonald, The American Museum of Natural History

S1.8.2 Bridging Learning in Informal Environments and School Contexts: The Nature Learning Camp as Boundary Object
Yew-Jin Lee, National Institute of Education, Singapore
Jennifer Yeo, National Institute of Education, Singapore

S1.8.3 Capturing Learning across Formal and Informal Contexts
Timothy D. Zimmerman, Rutgers University

S1.8.4 Construction of Science Discourse in an Extracurricular Science and Technology Project
Horace Webb, Georgia State University
Anton Puvirajah, Georgia State University
Geeta Verma, Georgia State University

Strand 7: Pre-service Science Teacher Education
S1.9 SC-Paper Set: Methods for Promoting Reflective Practice in Pre-Service Teacher Education
8:30am – 10:00am, Conference Room 407
Presider:
Julia Clark, NSF

S1.9.1 Pre-Service Teacher Learning From Online, Videocase-Based Modules: Results from the Videocases for Science Teaching Analysis (ViSTA) Study
Kathleen Roth, BSCS
Karen B. Givvin, UCLA
Catherine Chen
Meike Lemmens
Helen Garnier, UCLA
S1.9.2 Lesson Study with Preservice Elementary Teachers: Perceptions on the Role of Peer Feedback in Supporting Reflective Practice
Ingrid S. Weiland, Indiana University, Bloomington
Valarie L. Akerson, Indiana University, Bloomington
Meredith A. Park Rogers, Indiana University, Bloomington
Khemnawadee Pongsanon, Indiana University, Bloomington

S1.9.3 Using Observation Prompts in the Elementary Field Placement
Felicia M. Mensah-Moore, Teachers College, Columbia University

S1.9.4 Reflection in Teacher Education: Exploring Preservice Science Teachers’ Understanding and Implementation of Inquiry
Selcen S Guzey, University of Minnesota
Gillian Roehrig, University of Minnesota
Barb Billington, University of Minnesota

Strand 8: In-service Science Teacher Education
S1.10 SC-Paper Set: Science Teacher Communities
8:30am – 10:00am, Conference Room 408
Presider: Ayelet Weizman, Weizmann Institute

S1.10.1 Examining Topic-Specific Professional Development in a Science Teacher Induction Program
Jeffrey J. Rozelle, Syracuse University
Jodie A. Galosy, University of California at Davis
Jamie N. Mikeska, Michigan State University
Katie R. Green, Michigan State University
Suzanne M. Wilson, Michigan State University

S1.10.2 Science Teachers as Reform Leaders in their Community
Ayelet Weizman, Haifa University
Ayelet Egosi, Haifa University
Lily Orland-Barak, Haifa University

S1.10.3 Teachers and Researchers Learning in Communities: Enhancing Praxis in STSE Education
Erminia G. Pedretti, OISE, University of Toronto
Katherine Bellomo, University of Toronto

S1.10.4 Membership to a Teacher Professional Learning Community: A Stimulus for Teacher Movement from Central to Periphery
Viola Manokore, Michigan State University
Gail Richmond, Michigan State University

Strand 9: Reflective Practice
S1.11 SC-Paper Set: Informing Practice
8:30am – 10:00am, Conference Room 409
Presider: Amy E. Trauth-Nare, Indiana University

S1.11.1 What Does It Mean To Be Reflective Science Teacher Educators? What/How Can We Learn About Our Practice?
Deborah J. Trumbull, Cornell University
Kimberly G. Fluet, University of Rochester

S1.11.2 Expanding the Action Research Process to Facilitate Transformation in the Teaching of Science
Kimberly A. Lebak, The Richard Stockton College of New Jersey
Ron Tinsley, The Richard Stockton College of New Jersey

S1.11.3 A Teacher Inquiry Project: Teachers’ Practices of Classroom Inquiry Informing Research on Teacher Knowledge and Learning
Youngjin Song, University of Northern Colorado
Steve Oliver, University of Georgia

Strand 10: Curriculum, Evaluation, and Assessment
S1.12 SC-Paper Set: Science Curriculum, Instruction and Assessment: Perspectives of Students
8:30am – 10:00am, Conference Room 410
Presider: Ling L. Liang, LaSalle University

S1.12.1 Conceptions of Science Assessment among Tenth Graders in Taiwan: A Phenomenographic Study
Min-Hsien Lee, National Taiwan University of Science and Technology
Chin-Chung Tsai, National Taiwan University of Science and Technology

S1.12.2 What Do Students Know about Engineering and Technology? Effects of a Design Unit
Cathy P. Lachapelle, Museum of Science, Boston
Brandon J. Orszulak, Museum of Science, Boston
Alexandra Stein, Museum of Science, Boston
Lily Zhang, Museum of Science, Boston
Christine M. Cunningham, Museum of Science, Boston

S1.12.3 Improving Students’ Attitudes toward Science: A Case Study of one High School Defying the Odds
Grady J. Venville, University of Western Australia
Mary Oliver, University of Western Australia
Nancy Longnocker, University of Western Australia
Leonie Rennie, Curtin University of Technology
S1.12.4 Science Performance of English Language Learners: Findings from 1996, 2000, 2005 Science NAEP Assessments
Jerome M. Shaw, University of California, Santa Cruz

Strand 11: Cultural, Social, and Gender Issues
S1.13 SC-Paper Set: Gender and Retention in Science: Schooling Effects and Career Trajectories
8:30am – 10:00am, Conference Room 411

Presider:
Jane L. Lehr, California Polytechnic State University

S1.13.1 Gender Differences in the Timeline of Career Events for Physical Scientists
John T. Almarode, University of Virginia
Zahra Hazari, Clemson University
Robert H. Tai, University of Virginia

S1.13.2 Exploring the Relationship between Self-efficacy and Retention of Students, both Men and Women, in Introductory Physics
Vashti Sawtelle, Florida International University
Eric Brewe, Florida International University
Laird Kramer, Florida International University

S1.13.3 Examining the Relationship between Single-Sex Experiences in High School Science and Science Career Choice
Zahra Hazari, Clemson University
Philip M. Sadler, Science Education Department Harvard Smithsonian Center for Astrophysics Cambridge, Massachusetts
Gerhard Sonnert, Harvard

S1.13.4 Exploring the Experiences of Female Graduate Students in the Physical Sciences: A Comparative Study
Geoff Potvin, Clemson University
Erin Bauknight, Clemson University
Kimberly Cellucci, Clemson University
Robert H. Tai, University of Virginia

Strand 12: Educational Technology
S1.14 SC-Paper Set: Examining the Impact of Multimedia on Science Teaching and Learning
8:30am – 10:00am, Conference Room 412

Presider:
Diane Jass Ketelhut, Temple University

S1.14.1 How does Multimedia Integrated within a Planetary Science Course Help Students with Difficult Material?
Rebecca R. Deutscher, University of California at Berkeley

S1.14.2 Animated Movies in Science Education: Their Affect on Elementary School Students’ Motivation To Learn Science and Achievements
Miri Barak, Technion - Israel Institute of Technology
Tamar Ashkar, Technion - Israel Institute of Technology
Yehuald Judy Dori, Technion - Israel Institute of Technology

S1.14.3 Integrating Virtual Laboratories with Hands-on Inquiry: The Roles of Perceptual Supports for Learning
Eva E. Toth, West Virginia University
Dana Schneider, Duquesne University; School of Education
Becky M. Morrow, Duquesne University
Lisa L. Ludvico, Duquesne University

S1.14.4 Science Process Skills through Interactive Software in Middle School Chilean Learners
Ruby Olivares, University of Chile
Jaime Sanchez, University of Chile

Strand 13: History, Philosophy, and Sociology of Science
S1.15 SC-Paper Set: Biology, Evolution, and Nature of Science
8:30am – 10:00am, Conference Room 413

Presider:
Catherine Koehler, Illinois Institute of Technology

S1.15.1 College Students’ use of Science Content during Socioscientific Issues Negotiation: Evolution as a Prevailing Concept
Samantha R. Fowler, Clayton State University
Dana L. Zeidler, University of South Florida

S1.15.2 Influence of the Nature of Science Instruction on the Learning of Evolution: A Qualitative Study
Wilbert Butler, Tallahassee Community College
Sherry A. Southerland, Florida State University

S1.15.3 No Progress: The Rhetoric of Decline in a Regional Creationist Facility
Paul Wendel, Mansfield University

S1.15.4 Darwin and the Nature of Science: Investigating the Use of Knowledge, Belief, Acceptance, and Understanding in the Origin of Species
Mike U. Smith, Mercer University School of Medicine
Strand 14: Environmental Education
S1.16 SC-Paper Set: Urban Environments and Student Learning in Environmental Education
8:30am – 10:00am, Conference Room 414

Presider:
Peggy L. Preusch, Townsend University

S1.16.1 Bouncing and Trapping the Sun’s Rays: Seventh Grade Students’ Mental Models of the Greenhouse Effect
Daniel P. Shepardson, Purdue University
Soyoung Choi, Purdue University
Dev Niyogi, Purdue University
Umarporn Charusombat, Purdue University

S1.16.2 Exploring Positionality in Urban Children’s Sense of Place
Miyoun Lim, Georgia State University
Monday, March 22, 2010

S1.16.3 Investigating the Implementation of a Land Use Change Curriculum with Urban Middle School Learners
Alec M. Bodzin, Lehigh University

Co-Sponsored Session—External Policy and Relations Committee & Strand 15: Policy
8:30am – 10:00am, Conference Room 415

Discussant:
Steve Robinson, USDOE

Presenters:
Michele Cahill, Urban Education Carnegie Corporation of New York
Sharon J. Lynch, The National Science Foundation
Elizabeth A. Davis, University of Michigan

Break
10:00am – 10:30am
Salons E and F

Concurrent Session #2
10:30am – 12:00pm

Publications and Advisory Committee Sponsored Session
S2.1 Administrative Symposium: Publication in the Journal of Research in Science Teaching
10:30am – 12:00pm, Conference Room 501
Angela Calabrese Barton, Michigan State University
Joseph S Krajcik, University of Michigan

Strand 1: Science Learning, Understanding and Conceptual Change
S2.2 SC-Paper Set: Representational Reasoning
10:30am – 12:00pm, Conference Room 401

Presider:
Nikki Hanegan, Brigham Young University

S2.2.1 Identifying Cognitive Processes as Learners Engage With Multimedia Presentations
Michelle Cook, Clemson University

S2.2.2 Knowledge of Scale Construction for Graphing in Undergraduate Students
Cesar Delgado, University of Texas at Austin

S2.2.3 Effectiveness of Scientific Visualizations for Supporting Conceptual Development in High School Physics and Chemistry
David R. Geelan, The University of Queensland, Brisbane, Australia
Michelle M. Makherjee, The University of Queensland, Australia
Brian Martin, The Kings University College, Canada
Peter Mahaffy, The Kings University College, Canada

S2.2.4 Student Summative Assessment in Science: The Effects of an Explicit Representational Focus
Bruce Waldrip, Monash University
Vaughan Prain, La Trobe University
Strand 2: Science Learning: Contexts, Characteristics and Interactions
S2.3 Symposium: Questions and Insights about Blacks in K-Career Science Education: Complexities and Centrality of Contexts from African Diasporic Perspectives
10:30am – 12:00pm, Salon D

Presider:
Malcolm Butler, University of South Florida-Petersburg

Discussants:
Eileen R.C. Parsons, University of North Carolina at Chapel Hill
Mary M. Atwater, University of Georgia

Presenters:
Mary M. Atwater, University of Georgia
Eileen R.C. Parsons, University of North Carolina at Chapel Hill
Jennifer Adams, Brooklyn College-CUNY
Kabba Colley, Eduinformatics, Vermont
Christopher Emdin, Teachers College, Columbia University
Shirley G. Key, University of Memphis
Jacqueline T. McDonnough, Virginia Commonwealth University
Obad Norman, Morgan State University
Wesley Pitts, Lehman College, CUNY

S2.4 SC-Paper Set: Discussion and Interaction in Science Learning
10:30am – 12:00pm, Conference Room 402

Presider:
Phil Scott, University of Leeds

S2.4.1 What Student Talk Teaches Us: Findings from a Study of a Science Professional Development Model Incorporating Student Interaction Strategies
Therese B. Shanahan, University of California, Irvine
Lauren M. Shea, University of California, Irvine

S2.4.2 Engaging Students in Guided Science Inquiry Discussions: Elementary Teachers’ Oral Strategies
Alandeom W. Oliveira, State University of New York at Albany

S2.4.3 Identifying Effective Feedback Practices on Student Learning: A Literature Synthesis
Maria Ruiz-Primo, University of Colorado Denver
Min Li, University of Washington
Yue Yin, University of Illinois, Chicago
Andrew E. Morozov, University of Washington
Satprit Kaur, University of Washington
Courtney Courtney, University of Washington

S2.4.4 A Model of Collaborative Discourse to Promote Participatory Classroom Culture and Literacy in a High-school Science Classroom
Jessica Mezei, Teachers College, Columbia University
Ann Rivet, Teachers College, Columbia University

Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies
S2.5 SC-Paper Set: Science as a Catalyst for Interdisciplinary Learning
10:30am – 12:00pm, Conference Room 403

Presider:
Janell Catlin, Teacher College-Columbia University

S2.5.1 Biomusic: Science and Music Interdisciplinary Curriculum Development for the Elementary Classroom
Sarah Carrier, North Carolina State University
Eric N. Wiebe, North Carolina State University
Patricia Gray, University of North Carolina - Greensboro
David Teachout, University of North Carolina - Greensboro

S2.5.2 Teaching about Nature of Science and Scientific Inquiry Integrated With Language Arts at The Elementary Level
Hasan Deniz, University of Nevada Las Vegas
Valarie L. Akerson, Indiana University Bloomington

S2.5.3 To What Extent Do Science Trade Books Provide Vocabulary Support and Promote Inquiry?
Hagop Yacoubian, University of Alberta
Carolyn Freed, University of Alberta
Sun Joo Hur, University of Alberta
Yu Lei, University of Alberta
Michelle Miller, University of Alberta
Linda M. Phillips, University of Alberta
Stephen P. Norris, University of Alberta

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies
S2.6 SC-Paper Set: Strategies for Improving Student Learning
10:30am – 12:00pm, Conference Room 404

Presider:
William R. Veal, College of Charleston
S2.6.1 The Effect of Science Writing Heuristic Approach on Chemistry Achievement of 9Th Grade Students
Sevgi Kingir, Selcuk University
Omer Geban, Middle East Technical University
Murat Gunel, Ataturk University

S2.6.2 The Use of Learning Contracts on Tenth Grade Urban High School Student Motivation in Biology
Sean Kendall
Issam H. Abi-El-Mona

S2.6.3 Incidental Use of Concept Maps and Its Effects on Student Understanding of Optics
Roland Meijerink, Herbert Vissers College, Nieuw-Vennep (the Netherlands)
Jan T. van der Veen, University of Twente, Enschede (the Netherlands)

S2.6.4 The Effect of Macro-Micro-Symbolic Teaching on Grade Ten Students’ Conceptual Understanding of Chemical Reactions
Lama Z. Jaber, American University of Beirut
Saouma BouJaoude, American University of Beirut

Strand 5: College Science Teaching and Learning (Grades 13-20)
S2.7 SC-Paper Set: Assessment of Student Learning and Faculty Teaching in College Science Courses
10:30am – 12:00pm, Conference Room 405
Presider: Martin Geodhart, University of Groningen, The Netherlands

S2.7.1 A Way Forward for Mixing Quantitative and Qualitative Methods of Studying Problem Solving
Ozcan Gulacar, Southern Connecticut State University
Herb Fynewever, Calvin College

S2.7.2 Undergraduate Science Assessment in Context: A Case Study of a Biology Professor’s Classroom Assessment Environment and Student Assessment Experiences
Michele H. Lee, University of Missouri
Aaron J. Sickel, University of Missouri

S2.7.3 Development of an Assessment Tool for Advanced Observational Skills
J. M. Landin, North Carolina State University

S2.7.4 University Faculty Assessments of Reformed Teaching and Learning Practices: Validating a New Measure
Lisa Martin-Hansen, Georgia State University
Chad D. Ellett, CDE Research
Judy Morsaas, University System of Georgia, Board of Regents
Kadir Demir, Georgia State University

S2.7.5 Students’ Geocognition of Deep Time, Conceptualized in an Informal Educational Setting
Renee M. Clary, Mississippi State University
James H. Wandersee, Louisiana State University
Robert F. Brzuszek, Mississippi State University

Strand 6: Science Learning in Informal Contexts
S2.8 SC-Paper Set: Museums and School Field Trips
10:30am – 12:00pm, Conference Room 406
Presider: Sandra T. Martell, U Wisconsin Milwaukee

S2.8.1 A Comparison of Views about Nature of Science Among Informal Science Educators and Exhibit Designers
Gary M. Holliday, Illinois Institute of Technology
Norman G. Lederman, Illinois Institute of Technology

S2.8.2 Teachers’ Sources of Knowledge for Field Trip Practices
Bryan M. Rebar, Oregon State University

S2.8.3 Communicating Phylogeny: Evolutionary Tree Diagrams in Museums
Teresa E. MacDonald, University of Kansas Natural History Museum

S2.8.4 Experience with an Informal Science Center Exhibit on a Field Trip as Preparation for Future Learning
Bill Watson, The George Washington University

Strand 7: Pre-service Science Teacher Education
S2.9 SC-Paper Set: Pre-Service Teachers Learning To Teach Through Inquiry
10:30am – 12:00pm, Conference Room 407
Presider: Meredith Houle, San Diego State

S2.9.1 Preservice Elementary Teachers’ Adaptation of Science Curriculum Materials for Inquiry
Cory T. Forbes, University of Iowa College of Education
S2.9.2 Being In The Hot Spot: How Beginning Teachers’ Describe Their Experiences Enacting Inquiry Within The Culture Of Schools?
Oliver Dreon, Millersville University
Scott McDonald, Penn State University

S2.9.3 Beyond “Repeating the Textbook” and “Problem Solving”: Teacher Candidates Talk about Learning to Teach Physics
Shawn M. Bullock, University of Ontario Institute of Technology

S2.9.4 Promoting PCK Development in an Ecology-specific Methods Course: A Characterization of Teacher Educator’s Practice
Danusa Munford, Universidade Federal de Minas Gerais, Brazil
Letícia M. Calab, Universidade Federal de Minas Gerais, Brazil
Paulina M. Barbosa, Instituto de Biociências, Brazil

Strand 8: In-service Science Teacher Education
S2.10 SC-Paper Set: Beliefs
10:30am – 12:00pm, Conference Room 408
Presider:
Lisa Brooks, Washington University

S2.10.1 Inquiry Professional Development: Can We Use Teacher Beliefs to Predict Who Will Enact Reform Practices?
Christine R. Lotter, University of South Carolina
Greg Rushton, Kennesaw State University
Jonathan Singer, University of Maryland, Baltimore County

S2.10.2 Teacher Beliefs about Teaching and Learning with a Focus on Teacher Beliefs about How Students Learn
Anita M. Martin, University of Illinois
Brian Hand, University of Iowa
Soonhye M. Park, University of Iowa

S2.10.3 Beginning Secondary Science Teachers in Their First Three Years of Teaching: Changes in Beliefs and Practices
Julie A. Luft, Arizona State University
Krista Adams, Arizona State University
Jonah Firestone, Arizona State University
Irasema B. Ortega, Arizona State University
Sissy S Wong, Arizona State University
Derek Fay, Arizona State University

S2.10.4 Learning and Transfer in a Complex Professional Development Setting: A Cross-Case Analysis of the Perceptions and Practices of Science Teachers
Lisa Brooks, Washington University in St Louis
Carol L. Stuewe, Texas A&M University

Strand 9: Reflective Practice
S2.11 SC-Paper Set: Professional Development
10:30am – 12:00pm, Conference Room 409
Presider:
Penny J. Gilmer, Florida State University

S2.11.1 Expectations to Success—The Contrasting Journeys of a Teacher and His Coach
William L. Romine, University of Missouri
Andrew West, University of Missouri
Mark J. Volkmann, University of Missouri

S2.11.2 Addressing Socioscientific Issues in the Science Classroom: Lessons Learnt in Lesson Study
Isha DeCoito, York University
Maurice DiGiuseppe, University of Ontario

S2.11.3 Embedding Formative Assessment into Middle Level Problem-Based Science: A Participatory Action Research Study
Amy E. Trauth-Nare, Indiana University
Gayle A. Buck, Indiana University
Anndra Morgan, Monroe County Community School Corporation

S2.11.4 Building Professional Learning Communities for Developing Dialogic Practice and Argumentation in Science
Shirley Simon, Institute of Education London

Strand 10: Curriculum, Evaluation, and Assessment
S2.12 Administrative Symposium: Alignment among the Science Content Standards, Textbooks, and Standardized Tests: the Chinese Approach
10:30am – 12:00pm, Conference Room 410
Xiufeng Liu, State University of New York at Buffalo
Xian Chen, Nanjing Normal University
Yu-ying Guo, Beijing Normal University
En-shan Liu, Beijing Normal University
Lei Wang, Beijing Normal University
Zu-hao Wang, East China Normal University
Joe Engemann, Brock University
Strand 11: Cultural, Social, and Gender Issues
S2.13 SC-Paper Set: Language, Culture, and Identity: Pedagogical Implications
10:30am – 12:00pm, Conference Room 411
Presider: Carol Brandt, Virginia Tech University

S2.13.1 Testing a Model for Developing Content Knowledge and Academic Language in Science: The 5 Rs for Teaching Ella
Molly H. Weinburgh, Texas Christian University
Cecilia Silva, Texas Christian University
Tammy Oliver, Texas Christian University

S2.13.2 Access and Equity: A Teacher’s Role in Border Crossing
Adriane M. Slaton, Michigan State University

S2.13.3 Cultural Relevance in Science Pedagogy (CRISP): Results of an Action Research Network
Mistilina Sato, University of Minnesota
Stacy A. Ernst, University of Minnesota

S2.13.4 Working Together For Student Success: The Development of a Culturally-Relevant Science Curriculum for a Tribal College
Jessie C. Antonellis
Monday, March 22, 2010

Strand 12: Educational Technology
10:30am – 12:00pm, Conference Room 412
Presider: Roger Taylor, Vanderbilt University

S2.14.1 The Life Cycles of Technological Tools: Implications for the Science Classroom
Noemi Waight, University at Buffalo
Fouad Abd-El-Khalick, University of Illinois at Urbana-Champaign

S2.14.2 Wiimote Interactive Whiteboards: Outcomes from Three Undergraduate Preservice Student Research Projects
Brian C. Baldwin, Kean University

S2.14.3 Assessing the Technology-Supported Science Learning Environment
Adit Gupta, Model Institute of Education & Research, India
Rekha B. Koul, Curtin University of Technology, Perth, Australia

S2.14.4 Designing and Evaluating Web-Based Interactive Learning Objects
Khang-Miant Sing, National Institute of Education, Singapore
Benson Soong, University of Cambridge, United Kingdom

Strand 13: History, Philosophy, and Sociology of Science
S2.15 SC-Paper Set: Scientists, Teachers, and Epistemology of Science
10:30am – 12:00pm, Conference Room 413
Presider: Michiel van Eijck

S2.15.1 Biotechnology and Risk: Perceptions of Science Instructors
Grant E. Gardner, North Carolina State University
Gail Jones, North Carolina State University

S2.15.2 Purposeful and Targeted Use of Scientists to Support In-Service Teachers’ Understanding and Teaching of Scientific Inquiry and Nature of Science
Kevin J. White, Illinois Institute of Technology
Norman G. Lederman, Illinois Institute of Technology

S2.15.3 The Influence of an Authentic Context on Enhancing Teachers’ Understandings of Nature of Science
Barbara A. Crawford, Cornell University
Xenia S Meyer, Cornell University
Daniel K. Capps, Cornell University

S2.15.4 Interactions between Inquiry Experiences and Epistemology in Understanding the Nature of Science in an Undergraduate Research Experience
Maya R. Patel, Cornell University
Deborah J. Trumbull, Cornell University
Barbara A. Crawford, Cornell University
Strand 14: Environmental Education
S2.16 Administrative Symposium: The Intersection of Research in Science Education and Environmental Education
10:30am – 12:00pm, Conference Room 414
Michael Barnett, Boston College
Sheron Mark, Boston College
Alec M. Bodzin, Lehigh University
Charles W. Anderson, Michigan State University
Kristin L. Gunckel, The University of Arizona
Beth Covitt, University of Montana
Lindsey Mohan, Michigan State University
Hui Jin, Michigan State University
Rita Hagevik, The University of Tennessee
Ioana Badara, University of Tennessee
Teddie Phillipson-Mower, University of Louisville

Co-Sponsored Session—External Policy and Relations Committee & Strand 15: Policy
10:30am – 12:00pm, Conference Room 415
Presiders:
Sharon J. Lynch, National Science Foundation
Elizabeth A. Davis, University of Michigan

Presenters:
Richard A. Duschl, Pennsylvania State University
Janice Earle, National Science Foundation
Francis Eberle, National Science Teachers Association
Jo Ellen Roseman, AAAS Project 2061
Sherry A. Southwell, Florida State University
Martin Stoesz, National Academies of Science

NARST Business Meeting
Free box lunch for first 100 participants who register to attend.
12:00pm – 12:45pm, Salon C

Concurrent Session #3
1:00pm – 2:30pm

Presidential Invited Session
S3.1 Symposium: Learning Progressions and Pathways
1:00pm – 2:30pm, Conference Room 501
Richard A. Duschl, Penn State University
Richard Lehrer, Peabody College Vanderbilt University
Tom Corcoran, Teachers College Columbia University
Ravit Duncan, Rutgers
Alicia Alonzo, Michigan State University
Cynthia Hamen Farrar, The College Board

Publications and Advisory Committee Sponsored Session
S3.2 Administrative Symposium: Minding the Research–Practice Gap: Attending to the Dialogic Nature of Research AND Practice
1:00pm – 2:30pm, Salon C
Discussant:
Carla Zembal-Saul, Penn State University
Panel Members:
Julie A. Luft, Arizona State University
John Settlage, University of Connecticut
Joe Krajcik, University of Michigan
Scott McDonald, Penn State University

Presenters:
Melissa Braaten, University of Washington - Seattle, WA
Bethany Sjoberg, Technology, Engineering, and Communications High School on the Evergreen Campus Highline, WA
Michelle Brown, O.Henry Middle School
Gretchen Kehrberg, O.Henry Middle School
Meena Balgopal, School of Education, Colorado State University
Shaun Cornwall, Shepardson Elementary School, Fort Collins, CO

Strand 1: Science Learning, Understanding and Conceptual Change
S3.3 SC-Paper Set: Learning and Argumentation in the Global Context
1:00pm – 2:30pm, Conference Room 401
Presider:
Kristy Loman Chiodo, University of South Florida

S3.3.1 Vygotsky and Primary Science: Theory into Practice
Colette Murphy, Queens University Belfast
S3.3.2 Elementary Children’s Preferences for Causal Justification  
Aylin Çam, Middle East Technical University  
William Sandoval, University of California, Los Angeles

S3.3.3 Profiling and Interpreting East African Students’ Science Learning Worldviews  
Samson M. Nashon, University of British Columbia  
David Anderson, University of British Columbia

S3.3.4 How Do Students’ Argumentations Depend On Their Conceptual Understanding And Vice Versa?  
Tanja Riemer, Leibniz University Hannover, Germany  
Claudia von Aufschnaiter, Justus-Liebig-University Gießen, Germany  
Jan Fleischhauer, Justus-Liebig-University Gießen, Germany  
Christian Rogge, Justus-Liebig-University Gießen, Germany

S3.5.3 Assessment of Scientific Argumentation in the Classroom: An Observation Protocol  
Patrick Enderle, Florida State University  
Joi P. Walker, Florida State University  
Catherine Dorgan, Florida State University  
Victor Sampson, Florida State University

S3.5.4 Argument-Based Activities in the Wake of the National Science Education Standards: A Review of Argument Activities in K-12 Science Classrooms from 1996-2009  
Andy R. Cavagnetto, Binghamton University-SUNY

Strand 2: Science Learning: Contexts, Characteristics and Interactions

S4.1 Symposium: What can we Learn from Classroom Videos? Physics Instruction in Finland, Germany, and Switzerland Compared  
1:00pm – 2:30pm, Salon D  
Knut Neumann, Leibniz-Institute for Science Education (IPN) Kiel  
Cornelia Geller, University Duisburg-Essen  
Jussi Helaakoski, University of Jyväskylä  
Melanie Keller, University Duisburg-Essen  
Jennifer Olszewski, University Duisburg-Essen  
Hans E. Fischer, University Duisburg-Essen  
Jouni Viiri, University of Jyväskylä

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

S4.2 SC-Paper Set: Exploring and Assessing Argumentation in Classrooms  
1:00pm – 2:30pm, Conference Room 402  
Presider:  
Patrick Enderle, Florida State University

S4.5.1 Explanation, Argument and Evidence in Science, Science Class, and the Everyday Lives of Fifth Grade Students  
Katherine L. McNeill, Boston College

S4.5.2 Questioning and Argumentation During Group Discussions in Science: Discursive Interactions Associated with Productive Discourse  
Christine Chin, National Institute of Education, Singapore  
Jonathan F. Osborne, Stanford University

S4.5.3 Assessment of Scientific Argumentation in the Classroom: An Observation Protocol  
Patrick Enderle, Florida State University  
Joi P. Walker, Florida State University  
Catherine Dorgan, Florida State University  
Victor Sampson, Florida State University

S4.5.4 Argument-Based Activities in the Wake of the National Science Education Standards: A Review of Argument Activities in K-12 Science Classrooms from 1996-2009  
Andy R. Cavagnetto, Binghamton University-SUNY

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

S4.7 SC-Paper Set: Technology for Science Teaching  
1:00pm – 2:30pm, Conference Room 404  
Presider:  
Gouranga Saha, Lincoln University

S4.7.1 Examining the Use of Laboratory Activities in Secondary Science Online  
Kent J. Crippen, University of Nevada Las Vegas  
Leanna M. Archambault, Arizona State University  
Cynthia L. Kern, University of Nevada Las Vegas
S3.7.2 Impact of GK12 Fellows on Teachers’ Pedagogical Practices and Students’ Science Attitudes
Kathryn Scantlebury, University of Delaware
George Watson, University of Delaware
John Madsen, University of Delaware
Jane B. Kahle, Miami University

S3.7.3 Scaffolded Development of Representation Skills in Chemistry: An Instructional Model to Integrate Digital Technologies
Annette I. Hilton, The University of Queensland, Australia

S3.7.4 Everyone Needs a PET – A Predictive Evaluation Tool to Help Teachers Select Technology
Michelle M. Mukherjee, The University of Queensland, Australia

Strand 5: College Science Teaching and Learning (Grades 13-20)
S3.8 SC-Paper Set: Professional Development and Resources for College Faculty and Teaching Assistants
1:00pm – 2:30pm, Conference Room 405
President: Ioana Badara, University of Tennessee

S3.8.1 Synergistic Interactions of K-12 Partnership Work, Research, and Teaching in Higher Education Science Faculty Members
Deborah Pomeroy, Arcadia University

S3.8.2 The Role of Professional Community in Promoting Changes in College Science Instruction and Supporting Successful University-School Partnerships
Stacy Olitsky, Math and Science Partnership of Greater Philadelphia

S3.8.3 Reforming Undergraduate Science Courses: How Much Does Funding Matter?
Corinne Lardy, San Diego State University
Cheryl L. Mason, San Diego State University

S3.8.4 Fostering the Facilitation of Collaboration: An Inquiry into Graduate Teaching Assistant Professional Development
Bridget Brennan, University of Delaware

S3.9 SC-Paper Set: Investigating Informal Science Education on a Large-Scale
1:00pm – 2:30pm, Conference Room 406
President: Leonie Rennie, Curtin University

S3.9.1 Measuring the Impact of a Science Center on Its Community
John H. Falk, Oregon State University

S3.9.2 A Multisited Ethnography of Diverse Urban Youths’ Forms of Participation and Intercultural Positioning in Community Science Programs
Irene Rahm, Université de Montréal, Canada
Fasil Kanouté, Université de Montréal, Canada
Anne Gorry, Université de Montréal, Canada
Itzel Vazquez, Université de Montréal, Canada
Audrey Lachaîne, Université de Montréal, Canada

S3.9.3 The Use of the Nature of Scientific Knowledge Scale as an Entrance Assessment in a Large, Online Citizen Science Project
Aaron Price, Tufts University

S3.9.4 The Impact of Free-Choice STEM Experiences on Girls’ Interest, Engagement, and Participation in Science Communities, Hobbies and Careers: Results of Phase 2
Lynn D. Dierking, Oregon State University
Dale McCreedy, Franklin Institute Science Museum

Strand 6: Science Learning in Informal Contexts
S3.10 SC-Paper Set: Content Specific Issues in Pre-Service Teacher Education
1:00pm – 2:30pm, Conference Room 407
President: Claire Hodkin, University of Texas

S3.10.1 Attitudes of Teacher Students towards Fostering Competence-Oriented Teaching of Biology
Doris Elster, University of Vienna

S3.10.2 Backwards Faded Scaffolding Impact on Pre-Service Teachers’ Cognition in Astronomy
Stephanie J. Slater, University of Wyoming
Daniel J. Lyons, University of Wyoming
Timothy F. Slater, University of Wyoming
S3.10.3 Examining Student Teachers’ Use of Atomic Models in Explaining Subsequent Ionisation Energy Values
Ruth Wheeldon, Institute of Education, London

S3.10.4 Towards Treating Chemistry Teacher Candidates as Human
Brian Lewthwaite, University of Manitoba
Rick Wiebe, St James-Assiniboia School Division

S3.11 SC-Paper Set: Reasoning and Modeling
1:00pm – 2:30pm, Conference Room 408

Presider:
Leigh K. Smith, Brigham Young University

S3.11.1 Teaching for Transfer: Transforming Knowledge into Practice
Leigh K. Smith, Brigham Young University
Pamela Cantrell, Brigham Young University

S3.11.2 What Makes For An “Exemplary” Science Lesson?: Model Based Reasoning And Science Teachers’ Evolving Understanding Of Curriculum
Cynthia Passmore, University of California, Davis
Patrick F. Dowd, University of California, Davis
Connie J. Hvidsten, University of California, Davis
Lin Xiang, University of California, Davis
Arthur C. Beauchamp, University of California, Davis

S3.11.3 Teacher Learning: Co-Constructing An Understanding Of Model-Based Reasoning And Its Implementation In Secondary Classroom Contexts
Connie J. Hvidsten, University of California, Davis
Cynthia Passmore, University of California, Davis

S3.11.4 Hat Are The Differences Between Science Majored And Non-Science Majored In-Service Teachers’ Knowledge About Functions Of Models And Modeling Processes?
Jing-Wen Lin, Taipei Municipal University of Education
Hsiu-Fen Lin, Taipei Municipal University of Education
Yu-Lun Wu, Taipei Municipal University of Education

S3.12 SC-Paper Set: Uses of Technology
1:00pm – 2:30pm, Conference Room 409

Presider:
Shirley Simon, University of London

S3.12.1 Cognitive Presence in E-mail Listserv: Secondary Teachers’ Reflective Discourses on Food and Nutrition Instruction
Ting-Fang Hsu, Indiana University

S3.12.2 Research into Practice: Using Digital Video to Foster Pre-Service Science Teachers’ Collaborative Reflection around Scientific Inquiry
Len Newton, The University of Nottingham, UK
Pete Sorensen, The University of Nottingham, UK

S3.13 SC-Paper Set: Developing Standards-Aligned Items to Assess Student Understanding
1:00pm – 2:30pm, Conference Room 410

Presider:
George E. DeBoer, AAAS

S3.13.1 Probing Middle and High School Students’ Understanding of the Forms of Energy, Energy Transformation, Energy Transfer, and Conservation of Energy Using Content-Aligned Assessment Items
Cari F. Herrmann-Abell, AAAS Project 2061
George E. DeBoer, AAAS Project 2061

S3.13.2 Using Content-Aligned Assessments to Probe Middle School Students’ Understanding of Fundamental Concepts for Weather and Climate
Jill A. Wertheim, AAAS/Project 2061
George E. DeBoer, AAAS/Project 2061

S3.13.3 Testing the Validity of an Approach for Developing High Quality Assessment Items in Middle School Science
George E. DeBoer, AAAS Project 2061
Cari F. Herrmann-Abell, AAAS Project 2061
Jill A. Wertheim, AAAS Project 2061

S3.13.4 Probing Students’ Ideas about Models Using Standards-Based Assessment Items
Ted Willard, AAAS Project 2061
Jo Ellen Roseman, AAAS Project 2061

S3.14 SC-Paper Set: Constructing Views of Self and Science through Classroom Discourse
1:00pm – 2:30pm, Conference Room 411

Presider:
Michiel van Eijck, Eindhoven University of Technology
Gayle A. Buck, Indiana University-Bloomington
Cassie F. Quigley, Indiana University-Bloomington
Nicole Beeman-Cadwallader, Indiana University-Bloomington
Valarie L. Akerson, Indiana University-Bloomington

S3.14.2 Interplay of Discourses (D / D1) as Third grade Urban and Suburban Students Learn Science
Carmen Mendoza, University of Cincinnati

S3.14.3 Leveraging Students’ Everyday Resources: A Microanalysis of Classroom Interactions in a 4th Grade Lesson
Blakely K. Tsurusaki, Washington State University

S3.14.4 Students’ Subject Positioning According to Science Teaching Modalities in Terms of Discourse Register and Language Code
Seung-Ho Maeng, Seoul National University
Chan-Jong Kim, Seoul National University

Strand 12: Educational Technology
S3.15 SC-Paper Set: Technology, Teacher Learning, and Teacher Practice
1:00pm – 2:30pm, Conference Room 412
Presider: Miri Barak, Technion

S3.15.1 Using Video Games to Support Pre-Service Elementary Teachers Learning of Basic Physics Principles
Janice L. Anderson, University of North Carolina at Chapel Hill
Michael Barnett, Boston College

S3.15.2 Can A Digital Switchover In Primary Science Switch On The Learner?
John F. McCullagh, Stranmills University College
Belfast Northern Ireland
Julian G. Greenwood, Stranmills University College
Belfast Northern Ireland

S3.15.3 Learning in Context: Technology Integration in a Teacher Preparation Program Informed by Situated Learning Theory
Jennifer L. Maeng, University of Virginia
Randy L. Bell, University of Virginia

S3.15.4 Using Peer-Driven Web-based Formative Assessment to Improve Students’ e-Learning Effectiveness
Tzu-Hua Wang, National HsinChu University of Education, Taiwan

Strand 13: History, Philosophy, and Sociology of Science
S3.16 Administrative Symposium: Putting Nature of Science Research into Classroom Practice: Real Teachers...Real Teaching
1:00pm – 2:30pm, Conference Room 413
Discussant: Robin Millar, University of York
Presenters:
Valarie L. Akerson, Indiana University
Robert Pearson, Eddyville Schools, Oregon
Alice Siu Ling Wong, The University of Hong Kong
Ho Yin Lie, Po Kok Secondary School, Hong Kong
Ellen Granger, Florida State University, Florida
Karen Rose, Rickards High School, Florida
Norman G. Lederman, Illinois Institute of Technology
Judith S. Lederman, Illinois Institute of Technology
Norman G. Lederman, Illinois Institute of Technology
Judith S. Lederman, Illinois Institute of Technology
Renee’ Schwartz, Western Michigan University
Sherry A. Southerland, Florida State University

Strand 14: Environmental Education
S3.17 SC-Paper Set: Teachers’ Impacts on Environmental Education
1:00pm – 2:30pm, Conference Room 414
Presider: Carol Brandt, Virginia Tech

S3.17.1 Investigation of Pre-Service Science Teacher’s Beliefs Regarding the Nature of Environmental Knowledge
Elif Adibelli, Middle East Technical University
Ozgul Yilmaz-Tuzun, Middle East Technical University

S3.17.2 Revitalization of the Shared Commons: Implications for Eco-Justice and Place-Based Education
George E. Glasson, Virginia Polytechnic Institute and State University

S3.17.3 Exploring Science Teachers’ Affinity for Nature
Charles J. Rop, The University of Toledo
S3.17.4 The Piloting of Two Instruments to Measure Prospective and Practicing Teachers' Understanding of and Attitudes about Global Climate Change
Julie Lambert, Florida Atlantic University
Abdou Ndoye, University of North Carolina Wilmington
Cyndy Leard, FutureVision, Inc.
Joan Lindgren, Florida Atlantic University
Laura Cottongim, University of Hawaii

Strand 15: Policy
S3.18 SC-Paper Set: Elementary School Science and NCLB: Challenges and Responses
1:00pm – 2:30pm, Conference Room 415
Presider: Sarah Carrier, NCSU

S3.18.1 District Leadership and Policy for Science Education under NCLB: The Use of K-12 Departments to Support Elementary Science Education
Christopher L. Miller, University of Illinois at Chicago

S3.18.2 Toward a Curricular Policy for Advancing School Reform by Integrating Reading Comprehension within Time-Expanded Science Instruction in Grades K-5
Michael R. Vitale, East Carolina University
Nancy R. Romance, Florida Atlantic University

S3.18.3 Elementary Teachers’ Beliefs about Teaching Science: Examining the Impact of Pre/Post NCLB Testing in Science
Andrea R. Milner, Adrian College
Toni A. Sondergeld, Bowling Green State University
Kadir Demir, Georgia State
Charlene M. Czerniak, The University of Toledo
Carla C. Johnson, University of Cincinnati

Concurrent Session #4
2:45pm – 4:15pm

S4.1 Administrative Symposium: The NARST Linking Science Educators Program (LSEP): Enhancing Capacity Building in Science Education in Developing Countries
2:45pm – 4:15pm, Conference Room 501
Presider: Mei-Hung Chiu, National Taiwan Normal University, Taiwan
Presenters: William C. Kyle, Jr., University of Missouri-St. Louis
Asrd T. Sinnes, Norwegian University of Life Sciences, Norway
Mercy Kazima, Chancellor College, Malawi
Dorothy Nampota, Chancellor College, Malawi
Uchenna Udeani, University of Lagos, Nigeria
John E. Penick, Sangari, Brasil
Mei-Hung Chiu, National Taiwan Normal University, Taiwan

Equity and Ethics Committee Sponsored Session
S4.2 Administrative Symposium: Equity and Ethics Scholar Symposium: Presenting Examples of Research into Practice and Practice Informing Research
2:45pm – 4:15pm, Salon D
Discussant: Julie Bianchini, University of California, Santa Barbara
Presenters: Mamta Singh, Texas State University
Joi Merritt, University of Michigan
Fran Mateycik, The Pennsylvania State University, Altoona
Rashmi Kumar, University of Pennsylvania
Younkyeong Nam, University of Minnesota
Femi Otulaja, The City University of New York

Strand 1: Science Learning, Understanding and Conceptual Change
S4.3 SC-Paper Set: Learning in Physics
2:45pm – 4:15pm, Conference Room 401
Presider: Laird Kramer, Florida International University

S4.3.1 Concept Networks Organizing Knowledge for Purposes of Physics Teacher Education
Ismo T. Koponen, University of Helsinki, Finland
Maija Pehkonen, University of Helsinki, Finland
S4.3.2 Cognition in Tackling an Unfamiliar Conceptual Physics Problem
David Schuster, Western Michigan University
Adriana Undreiu, University of Virginia’s College at Wise

S4.3.3 Facilitating Students’ Problem Solving Across Representations in Introductory Physics
Dong-Hai Nguyen, Kansas State University
N. Sanjay Rebello, Kansas State University

S4.3.4 Public Physics Lectures as an Instructional Resource: Tracing Changes in Students’ Knowledge
Shulamit Kapon, University of California, Berkeley
Uri Ganiel, Weizmann Institute of Science
Bat-Sheva Eylon, Weizmann Institute of Science

Strand 1: Science Learning, Understanding and Conceptual Change
S4.4 SC-Paper Set: Students’ Learning in the Biological Sciences
2:45pm – 4:15pm, Conference Room 413
Presider: Lisa Brooks, Washington University

S4.4.1 A More Fine-Grained Measure of Students’ Acceptance of Evolution: Development of The Inventory of Student Evolution Acceptance– I-SEA
Sherry A. Southerland, Florida State University
Louis S Nadelson, Boise State University

S4.4.2 Differentiation and Development of Five Levels in Scientific Inquiry Skills: A Longitudinal Assessment of Biology Students in Grade 5 to 10
Andrea Moeller, Justus-Liebig-University, Germany
Stefan Hartmann, Justus-Liebig-University, Germany
Juergen Mayer, Justus-Liebig-University Giessen

S4.4.3 The Impact of Classroom Argumentation about Socio-scientific Issues on High School Students’ Understanding of Genetics
Vaille M. Dawson, Curtin University
Grady J. Venville, University of Western Australia

S4.4.4 “Ascending the Pyramid”: Levels of Systems Thinking amongst 10th Grade Students while Studying Human Biology
Jaklin Tripto, Ben Gurion University of the Negev, Israel
Orit Ben-Zvi Assaraf, Ben Gurion University of the Negev, Israel
Anat Yarden, Weizmann Institute of Science, Israel

Strand 2: Science Learning: Contexts, Characteristics and Interactions
S4.5 SC-Paper Set: Agency and Equity in Science Classrooms
2:45pm – 4:15pm, Conference Room 402
Presider: Carrie T. Tzou, University of Washington

S4.5.1 The Impact of the SETGO (Science, Engineering, and Technology Gateway of Ohio) Program Mentoring on Student Attitude Changes and Retention
Tracy L. Huziak-Clark, Bowling Green State University
Moria van Staaden, Bowling Green State University
Anne Bullerjahn, Owens Community College

S4.5.2 Helping Minority Students Get into the Game: Research Outcomes of a Technology-Enhanced STEM Development Program
Sheron Mark, Boston College
David Blustein, Boston College
Michael Barnett, Boston College
Emily Hoffman, Urban Ecology Institute

S4.5.3 Discourse in Science Classrooms: The Relationship between Teacher Perceptions and their Practice
Diane Pimentel, Boston College
Katherine L. McNeill, Boston College

S4.5.4 Students Discussing Science: Individual and Collective Agency Challenging Structure and (Re) Shaping Identities in Science Classrooms
Lilian Pozzer-Ardenghi, McGill University
Gale Seiler, McGill University

Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies
S4.6 SC-Paper Set: Curriculum and Content Knowledge
2:45pm – 4:15pm, Conference Room 403
Presider: Therese B. Shanahan, UC Irvine

S4.6.1 Elementary Science Kits: Differential Use for Instruction and Assessment
Laura Robertson, North Carolina State University
Gail Jones, North Carolina State University
Grant E. Gardner, North Carolina State University
Sharon Dotger, Syracuse University
S4.6.2 Using Multiple Representations as a Means of Accessing Elementary Teachers’ Insights and Misconceptions About Science Principles
Suzanne M. Levine, University at Albany
Cheryl Sheehan, University at Albany
Audrey B. Champagne, University at Albany
Vicky L. Kouba, University at Albany

S4.6.3 The Particulate Model of Matter – An Instructional Challenge for Primary Education (Sixth Grade)
Georgios Tsaparlis, University of Ioannina
Paraskvi Dalaouti, Primary State Education, Ioannina, Greece

S4.6.4 Comparing Reform-Based and Traditional Curricula in a Large-Scale, Randomized Cluster Design Study: The Interaction between Curriculum and Teachers’ Knowledge and Beliefs
Yavuz Saka, Florida State University
Ellen M. Granger, Florida State University
Todd H. Bevis, Florida State University
Sherry A. Southerland, Florida State University

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies
S4.7 SC-Paper Set: Developing, Assessing, and Describing Science Teachers’ Pedagogical Content Knowledge
2:45pm – 4:15pm, Conference Room 404
Presider:
David R. Geelan, The University of Queensland

S4.7.1 Improved Science Assessments Using Student Perceptions
Rekha B. Koul, SMEC, Curtin University of Technology

S4.7.2 Teachers’ Approaches to Teaching Biological Evolution and the Nature of Science
Lisa A. Donnelly, Kent State University

S4.7.3 Examining Experienced Mentor Teachers’ Pedagogical Content Knowledge for Teaching Osmosis and Diffusion
Deanna M. Lankford, University of Missouri Columbia, Missouri
Patricia M. Friedrichsen, University of Missouri Columbia

S4.7.4 Development and Evaluation of an Instrument for Measuring Biology Teachers’ Pedagogical Content Knowledge (PCK)
Stephan Schmelzing, University Duisburg-Essen
Stefanie Wuesten, University Duisburg-Essen
Angela Sandmann, University Duisburg-Essen
Birgit Neuhaus, University LMU

Strand 5: College Science Teaching and Learning (Grades 13-20)
S4.8 SC-Paper Set: Research Experiences for Undergraduates
2:45pm – 4:15pm, Conference Room 405
Presider:
Toni A. Sondergeld, Bowling Green State University

S4.8.1 Assessing the Educational Contribution of the International Genetically Engineered Machine (iGEM) Research Project: Students’ and Mentors’ Perspective
Yehudit Judy Dori, Technion, Israel Institute of Technology and Massachusetts Institute of Technology
Gili Marbach-Ad, University of Maryland
Natalie Kuldell, Massachusetts Institute of Technology

S4.8.2 Student Learning Gains through Undergraduate Research Experiences with Two-Year College Students
Jeffrey S Carver, West Virginia University
Morna R. Brothers, Harold Washington College
Thomas Dow, William Rainy Harper College
Kate Edler, Illinois State University
Gregory Ferrence, Illinois State University
Yvonne Harris, William Rainy Harper College
Thomas B. Higgins, Harold Washington College
Roger House, William Rainy Harper College
William Hunter, Illinois State University
Stephanie Persson, Illinois State University

S4.8.3 Does Chem-Research Make a Difference?
Ted M. Clark, The Ohio State University
Jane B. Kahle, Miami University
Sarah B. Woodruff, Miami University
Yue Li, Miami University

S4.8.4 Undergraduate Research Experiences from a Longitudinal Perspective
Joseph A. Harsh, Indiana University
Adam V. Maltese, Indiana University
Robert H. Tai, University of Virginia

Strand 5: College Science Teaching and Learning (Grades 13-20)
S4.9 SC-Paper Set: Learning and Retention in Undergraduate Chemistry
2:45pm – 4:15pm, Conference Room 414
Presider:
Erika G. Offerdahl, North Dakota State University
S4.9.1 Designing and Evaluating a Teaching Intervention in Chemical Kinetics: Towards Research Evidence-Based Practice
Gultekin Cakmakci, Hacettepe University, Turkey
Cemil Aydogdu, Hacettepe University, Turkey

S4.9.2 Concurrent Enrollment in General Chemistry Lecture and Laboratory Decreases Withdrawal Rates and Increases Final Grades in the Lecture
Rebecca L. Matz, University of Michigan
Edward D. Rothman, University of Michigan
Joseph S Krajeck, University of Michigan
Mark M. Banaszak Holl, University of Michigan

S4.9.3 Academic Performance in Organic Chemistry: A Longitudinal Examination
Evan Szu, Stanford University
Kiruthiga Nandagopal, Stanford University
Richard J. Shavelson, Stanford University
Enrique J. Lopez, Stanford University
Geannine W. Hill, Pacific Graduate School
Maureen Scharberg, San Jose State University

S4.10 SC-Paper Set: Investigations of Affect in Informal Settings
2:45pm – 4:15pm, Conference Room 406
Presider:
Shawn Rowe, Oregon State University

S4.10.1 High School and College Students’ Evaluations of Scientific Media Reports: Questions Asked and Knowing What to Do with the Answers
Connie A. Korpan, Grande Prairie Regional College

S4.10.2 Raising Interest in Science Careers through Informal After-School ExperiencesRaising Interest in Science Careers through Informal After-School Experiences
Lorraine Savage, Temple University
Diane Jass Ketelhut, Temple University
Susan J. Varnum, Temple University
Judith Stull, Temple University

S4.10.3 Changes in Views of Scientists and Nature of Science: A Case Study of Middle School All Female Science Camp
Kristen J. Molyneaux, National High Magnetic Field Laboratory
Roxanne Hughes, Florida State University
Pat Dixon, National High Magnetic Field Laboratory

S4.10.4 When Was the Last Time You Saved a World? Children’s Informal Science Learning in a Multi-User Virtual Environment (MUVE)
Sherman Rosenfeld, The Weizmann Institute of Science
Ron Blonder, The Weizmann Institute of Science

S4.11 SC-Paper Set: Features & Effects of Pre-Service Teacher Education Reform
2:45pm – 4:15pm, Conference Room 407
Presider:
Cory T. Forbes, University of Iowa

S4.11.1 Can a UTeach-type Teacher Preparation Program Reduce Science Expert Blind Spot by Teaching the Inquiry Cycle?
David E. Kanter, Temple University
Teressa Chen, Temple University

S4.11.2 The Impact of Critical Learning Experiences on Science Teacher Development
Monica J. Young, Syracuse University
John W. Tillotson, Syracuse University
Glenn R. Dolphin, Syracuse University
Lauren Jetty, Syracuse University

S4.11.3 Systemic Reform in Pre-Service Science Teacher Education and Its Impact across the K-16 Educational Continuum
Margaret G. Shroyer, Kansas State University- College of Education
Amanda R. Morales, Kansas State University-College of Education
Cindi K. Dunn, Office of Educational Innovation and Evaluation
Cecilia Hernandez, Kansas State University

S4.11.4 Teaching About Teaching Science: What do Science Teacher Educators do and Why?
Amanda K. Berry, Monash University
Jan H. van Driel, ICLON, Leiden University, The Netherlands

S4.12 SC-Paper Set: Knowledge, Practice and Content
2:45pm – 4:15pm, Conference Room 408
Presider:
Maurice DiGiuseppe, University of Ontario Institute of Technology
S4.12.1 Meeting Teachers Where They Are and Helping Them Integrate Geospatial Technology into Their Teaching
Nancy M. Trautmann, Cornell University
James G. MaKinster, Hobart and William Smith Colleges

S4.12.2 Addressing Numeracy in a Science Lesson: A Case of Lesson Study
Maurice DiGiuseppe, University of Ontario Institute of Technology
Isha DeCoito, York University

S4.12.3 Facilitating Teacher Development towards a Tetrahedral Orientation in the Teaching of High School Chemistry
Rick Wiebe, St. James-Assiniboia School Division
Brian Lewthwaite, University of Manitoba
Harvey Peltz, River East-Transcona School Division

S4.12.4 Teachers’ Understanding of Context in Teaching Thermodynamics within a Construction Context
Lawrence B. Flick, Oregon State University
Sue DeChenne, Oregon State University

S4.13 SC-Paper Set: STS, Curriculum and Science Teacher Professional Development
2:45pm – 4:15pm, Salon C
Presider:
Andrew H. Falk, University of Michigan

S4.13.1 Teachers’ Integration of Science and Social Issues Using an Avian Influenza Curriculum Module
Tina M. Roberts, University of Missouri
Marcelle A. Siegel, University of Missouri
William L. Romine, University of Missouri

S4.13.2 Surveying K-12 Science Teachers’ Needs from Scientists for Curriculum Materials
Timothy F. Slater, University of Wyoming
Stephanie J. Slater, University of Wyoming

S4.13.3 Opportunities for Science Teacher Learning Through Approximations of Whole-Class Discussions
Andrew H. Falk, University of Michigan
LeeAnn M. Sutherland, University of Michigan

S4.13.4 Science Teachers’ Knowledge of, and Decisions on Integrating Science, Technology and Society (STS) Issues in the Science Curriculum
Azza A. Hashem, University of Exeter
Nasser Mansour, University of Exeter

S4.14 SC-Paper Set: Teacher-Based Instructional Design
2:45pm – 4:15pm, Conference Room 409
Presider:
Philip Clarkson, Australian Catholic Univ.

S4.14.1 Inquiry Into Teacher-initiated Curriculum Reform Work at the Illinois Mathematics and Science Academy
Tang Wee Teo, University of Illinois (Urbana-Champaign)

S4.14.2 Teachers’ Interpretations of the Design and Implementation of Inquiry Activities
Mónica M. Baptista, Centro de Investigação em Educação
Ana M. Freire, Universidade de Lisboa

S4.15 SC-Paper Set: National Science Curriculum and Assessment Reforms
2:45pm – 4:15pm, Conference Room 410
Presider:
Christine Harrison, King’s College - London

S4.15.1 Linking Physics Textbooks’ Content and the Content Validity of Nationwide Tests
Hendrik Haertig, University Duisburg-Essen, Germany
Alexander Kauertz, University of Education, Weingarten Germany
Knut Neumann, Leibniz Institute for Science Education, Germany
Hans E. Fischer, University Duisburg-Essen

S4.15.2 Science and Mathematics Curriculum Reform in Senior Secondary Education in the Netherlands: First Results of a Comprehensive and Longitudinal Evaluation Study
Wilmad Kuiper, Netherlands Institute for Curriculum Development / University of Utrecht
Elvira Folmer, Netherlands Institute for Curriculum Development
Wout Ottevanger, Netherlands Institute for Curriculum Development
Lucia Bruning, Netherlands Institute for Curriculum Development

S4.15.3 Multiple Aims in the Development of a Major Reform of the National Curriculum for Science in England
Jim Ryder, University of Leeds
Indira Banner, University of Leeds, UK
S4.15.4 Re-Conceptualization of Scientific Literacy for the 21st Century in Korea
Kyunghee Choi, Ewha Womans University
Sung-won Kim, Ewha Womans University, Korea
Hyunju Lee, Ewha Womans University, Seoul, Korea
Joseph S Krajcik, University of Michigan

Strand 11: Cultural, Social, and Gender Issues
S4.16 SC-Paper Set: Students, Teachers, And Scientists From Underrepresented Groups: Where Does Success Lie?
2:45pm – 4:15pm, Conference Room 411
Presider: Felicia M. Moore-Mensah, Teachers College

S4.16.1 Islam, Evolutionary Science, and Education: Paradoxes and Challenges in Muslim Cultures and Societies
Anila Asghar, The Johns Hopkins University
Saouma BouJaoude, American University of Beirut
Jason Wiles, Syracuse University
Brian Alters, McGill University

S4.16.2 Informing Science Teacher Retention and Attrition in the Rural Black Belt Region of Georgia
Georgia W. Hodges, University of Georgia
Steve Oliver, UGA
Deborah J. Tippins, UGA

S4.16.3 From Access to Success: Comparing Black Students’ and Black Scientists’ College Going Experiences
Bryan A. Brown, Stanford University
Bryan Henderson, Stanford University
Salina Gray, Stanford University

S4.16.4 To Iron or to Do Science: A Storied Life of a Latina from Scientist to Science Teacher
Sarida Hoy, Georgia State University
Geeta Verma, Georgia State University

S4.18 SC-Paper Set: Schools and University Partnerships for K-12 Science: Working Together for Change and Improvement
2:45pm – 4:15pm, Conference Room 415
Presider: Carol L. Stuessy, TAMU

S4.18.1 Strand Zero: A Request to De–Balkanize the Strands Structure within NARST
John Settlage, University of Connecticut

S4.18.2 What is a Partnership?
Andrea Burrows, University of Cincinnati

S4.18.3 Effect of STEM Faculty Engagement in the Math and Science Partnership Program
Xiaodong Zhang, Westat
Joseph McInerney, Westat
Monday, March 22, 2010

S4.18.4 Trends and Outcomes of NSF Stem Education Grants at the City University Of New York: Implications for Policy, Practice, and Future Initiatives
Angela M. Kelly, Lehman College
Serigne Gningue, Lehman College
Jinlin Chen, Queens College
Subash Shankar, Hunter College
Rathika Rajaravivarma, New York City College of Technology
Research Committee Sponsored Session
S5.3 Poster Symposium: Science Research Institute
4:30pm – 6:00pm, Salon D

S5.3.1 Beginning Secondary Science Teachers’ Pedagogical Content Knowledge and Their Use of Instructional Resources
Krista Adams, Arizona State University

S5.3.2 Science Teachers’ Voices: Eliciting Students’ Knowledge during Instruction
Comfort Atveh, University of California, Davis
Cynthia Passmore, University of California, Davis

S5.3.3 Teachers’ Perceptions of Implementing a Food Chemistry Unit within a National Chemistry Curriculum Reform
Shirly Avargil, Technion - Israel Institute of Technology
Orit Herscovitz, Technion - Israel Institute of Technology and Ort Braude Academic College of Engineering, Israel
Yehudit Judy Dori, Technion - Israel Institute of Technology

S5.3.4 From Gatekeepers to Dreamkeepers: Exploring the Role of Teacher Identity in Improving Cultural Competency for Science Teachers
Edith L. Blackwell, Morgan State University

S5.3.5 Mirror, Mirror & Preservice Teachers Reflect on their Initial Teaching Experience Using Video Analysis: A Cultural-Historical Explanatory Perspective
Elisebeth Boyer, Pennsylvania State University

S5.3.6 Elementary Teachers’ Science Practice, Beliefs and Content Knowledge During and Following a Reform-based Professional Development Program
Dina Drits, University of Utah

S5.3.7 Beliefs about Teaching and the Nature of Science of Certified and Non-Certified Secondary Science Teachers
Jonah Firestone, Arizona State University
Julie A. Luft, Arizona State University

S5.3.8 Science, Technology, and Pedagogy: Exploring Secondary Science Teachers’ Uses of Technology
Selcen S Guzey, University of Minnesota

S5.3.9 An Exploration of Urban Elementary Teachers’ Perspectives on Science Education Reform
Jessica Hammock, Emory University

S5.3.10 A Beginning Researcher’s Narratives on Learning How to Do Research through the NARST Summer Research Institute
Hosun Kang, Michigan State University

S5.3.11 Affordances of Mass Media as Teaching Tools in the Science Classroom: Perspectives from Secondary Science Teachers
Michelle Klosterman, University of Florida

S5.3.12 Transformations of Intentions in State Educational Policy: An Analysis of Science Teacher Professional Development Policy
Michele H. Lee, University of Missouri

S5.3.13 Using Activity Systems Analysis to Evaluate the Implementation of Science Curriculum at Multiple Illinois Schools
Jason McGraw, Northern Illinois University
Lisa Yamagata-Lynch, Northern Illinois University

S5.3.14 Remediation of University-Based Science Teacher Education
Deborah Morrison, University of Colorado at Boulder

S5.3.15 Beliefs and Practices of a Beginning Science teacher of ELLs: A Longitudinal Study
Irasema B. Ortega, Arizona State University

S5.3.16 An Interpretive Case Study of How Elementary Science Students Use Science Notebooks During Science Instruction in Elementary Science Classrooms
Lori Petty, Texas Tech University
Ratna Narayan, Texas Tech University

S5.3.17 Middle School Science Teachers’ Reflections on Video Cases about Their Use of Informal Formative Assessments (IFA)
Asli Sezen, Pennsylvania State University
Gregory Kelly, Pennsylvania State University

S5.3.18 Action Research: How Science Teachers Integrate Educational Technology
Demetrice Smith, Morgan State University
S5.3.19 Contextualizing Instruction for Cultural and Social Relevance: Exploring Preservice Secondary Science Teachers’ Beliefs, Knowledge, and Practices
Sara Tolbert, University of California - Santa Cruz

S5.3.20 Teachers’ Transformation of Nanoscience Subject Matter Knowledge
Emily Wischow, Purdue University
Lynn Bryan, Purdue University
George M. Bodner, Purdue University

S5.3.21 Developing a Dissertation Study: What Knowledge for Science Teaching Do University Science Instructors Use to Inform Their Planning and Teaching in Science Courses?
Stephen B. Witzig, University of Missouri

S5.3.22 The Impact of Induction: Beliefs and Practices of Beginning Science Teachers
Sissy S Wong, Arizona State University

Strand 1: Science Learning, Understanding and Conceptual Change

S5.4 Administrative Symposium: Representational Reasoning in the Teaching and Learning of Science
4:30pm – 6:00pm, Conference Room 409
Discussant: Marcia Lynn, University of California, Berkeley
Presenters: Eric N. Wiebe, North Carolina State University
James Minogue, North Carolina State University
Michael Carter, North Carolina State University
John C. Bedward, North Carolina State University
Lauren P. Madden, North Carolina State University
John K. Gilbert, The University of Reading
Maurice Cheng, University of Hong Kong
Peggy Van Meter, Pennsylvania State University
Zhihui Zhang, University of California, Berkeley

S5.5 SC-Paper Set: Childrens’ Learning about Science
4:30pm – 6:00pm, Conference Room 401
Presider: Lei Liu, University of Pennsylvania

S5.5.1 Large-Scale, Reandomized-Cluster Design Study of Reform-Based and Traditional/Verification Curricula to Support Student Science Learning
Ellen M. Granger, Florida State University
Todd H. Bevis, Florida State University
Yavuz Saka, Florida State University
Sherry A. Southerland, Florida State University

S5.5.2 Small Group Interviews: Gaining Valuable Insights into Elementary Students’ Astronomy Understandings and Thinking
Timothy R. Young, The University of North Dakota
Mark D. Guy, The University of North Dakota
Brent Miller

S5.5.3 Student Understanding of Scale: From Additive to Multiplicative Reasoning in the Construction of Scale Representation by Ordering Objects in a Number Line
Eun Jung Park, Northwestern University
Su Swarat, Northwestern University
Greg Light, Northwestern University
Denise Drane, Northwestern University

S5.5.4 Children’s Conceptions of Shadows
Robert Louisell, St. Ambrose University
Francis Kazemek, St. Cloud State University
Jennifer Wilhelm, University of Kentucky

Strand 1: Science Learning, Understanding and Conceptual Change

S5.6 SC-Paper Set: Models and Modeling in Science
4:30pm – 6:00pm, Conference Room 413
Presider: Vaille M. Dawson, Curtin University

S5.6.1 Development of Students’ Mental Models of Electrochemistry Using Multiple Model-Based Approaches
Mei-Hung Chiu, National Taiwan Normal University
Shiao-Lan Chung, National Taiwan Normal University

S5.6.2 High School Students’ Modeling Knowledge
David Fortus, Weizmann Institute of Science
Sherman Rosenfeld, Weizmann Institute of Science
Yael Shwartz, Weizmann Institute of Science

S5.6.3 The Effect of Linear Versus Branching Depictions of Evolutionary History on Students’ Interpretations of Evolution as an Anagenic Process
Laura R. Novick, Vanderbilt University
Courtney K. Shade, Vanderbilt University
Kefyn M. Catley, Western Carolina University
S5.6.4 What is a Model? Experienced Students’ Beliefs about the Nature and Purpose of Scientific Models Across Modeling Contexts
Brandy L. E. Buckingham, Northwestern University
Brian J. Reiser, Northwestern University

Strand 2: Science Learning: Contexts, Characteristics and Interactions
S5.7 SC-Paper Set: Science Learning Within and Beyond the Classroom
4:30pm – 6:00pm, Conference Room 402
Presider:
Maria-Pilar Jimenez-Aleixandre, Universidade de Santiago de Compostela

S5.7.1 Examining the Relationship between Students’ Connections to Out-of-School Experiences and Learning Outcomes
Natalie A. Tran, California State University - Bakersfield

S5.7.2 The Influence of Context-Oriented Learning in Biology Education
Marion Haugwitz, University of Duisburg-Essen
Sabine Fechner, University of Duisburg-Essen
Angela Sandmann

S5.7.3 Aspects and Outcomes of a Research Apprenticeship: Perspectives of High School Student Participants
Stephen R. Burgin, University of Florida
Troy D. Sadler, University of Florida
Jamie E. Mann, University of Florida

S5.7.4 Opportunities-to-Learn at Home: Profiles of Students with and without Reaching Science Proficiency
Xiufeng Liu, State University of New York at Buffalo
Melinda Whitford, State University of New York at Buffalo

Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies
S5.8 SC-Paper Set: Developing Teacher Knowledge
4:30pm – 6:00pm, Conference Room 403
Presider:
Meredith A. Park Rogers, Indiana University - Bloomington

S5.8.1 How Long-Term Teaching Practices Foster Teacher Learning In Inquiry-Based Environments
Mohammad A. Basir
Brian Hand
Lori Norton-Meier

S5.8.2 The Teachers’ Pedagogical Content on Inquiry that Conducts Science Activities in Basic Education
Flor Reyes, Universidad Nacional Autónoma de México, Facultad de Química
Andoni Garritz, Universidad Nacional Autónoma de México

S5.8.3 Elementary School Teachers’ Perceptions of Science Teaching
John M. Reveles, California State University, Northridge

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies
S5.9 SC-Paper Set: Inquiry-Based Science Teaching and Student Learning
4:30pm – 6:00pm, Conference Room 404
Presider:
Andrea R. Milner, Adrian College

S5.9.1 Teacher Effects in a Comparative Study of Direct and Inquiry Science Instruction Efficacy
William Cobern, Western Michigan University
David Schuster, Western Michigan University
Betty Adams, Western Michigan University
Adriana Undreiu, The University of Virginia’s College at Wise
Brandy A. Skjold, Western Michigan University
Brooks Applegate, Western Michigan University
Cathleen C. Loving, Texas A&M University
Janice D. Gobert, Worcester Polytechnic Institute

S5.9.2 The Relationship between Teachers’ Knowledge and Beliefs about Science and Inquiry and Their Classroom Practices
Saouma BouJaoude, American University of Beirut, Lebanon
Rayana F. Saad, American University of Beirut, Lebanon

S5.9.3 Taking Science Outside the Classroom: A Study of Teachers Enacting Urban Ecology Field Investigations
Amanda P. Jaksha, University of Arizona
Christopher J. Harris, SRI International

S5.9.4 The Relationship of Teacher Facilitated Inquiry-Based Instruction to Student Higher-Order Thinking
Jeff C. Marshall, Clemson University

Strand 5: College Science Teaching and Learning (Grades 13-20)
S5.10 SC-Paper Set: Beliefs and Teaching Practices of College Science Faculty
4:30pm – 6:00pm, Conference Room 405
Presider:
Kristen L. Hutchins, Howard Payne University
S5.10.1 Assessing University Students’ Perceptions of the Physics Teacher’s Pedagogical Content Knowledge Using a Developed Instrument
Syh-Jong Jang, Chung-Yuan Christian University

S5.10.2 The Analysis of Speech Acts of University Science Teachers
Roeland M. Van der Rijst, ICLON - Leiden University
Jan H. van Driel, ICLON - Leiden University

S5.10.3 Examining College Science Teachers’ Belief Systems about Inquiry-based Teaching in the Context of a Faculty Development Program
Kristen L. Hutchins, Howard Payne University
Patricia M. Friedrichsen, University of Missouri

S5.11 Symposium: Facilitating Informal Science Learning: People, Places and Technologies
4:30pm – 6:00pm, Conference Room 406
Heather T. Zimmerman, Penn State University
Lynn U. Tran, University of California at Berkeley
Cathlyn D. Stylianski, University of Maryland
Catherine Eberach, Rutgers
Kathleen Fadigan, Pennsylvania State University
Lisa Bouillon Diaz, University of Illinois at Urbana-Champaign
Lynn D. Dierking, Oregon State University
Heather King, King’s College London

S5.12 SC-Paper Set: The Influence of Identity and Attitude on Pre-Service Teachers’ Knowledge and Practices
4:30pm – 6:00pm, Conference Room 407
Presider: Tara B. O’Neill, Hawaii

S5.12.1 Toward Retaining Second Career STEM Teachers: The Influence of Transitioning Professional Identities
Carol C. Johnston, Mount Saint Mary’s College Los Angeles
Jeanne M. Grier, California State University Channel Islands

S5.12.2 A Grounded Theory Analysis of the Career Paths of Math and Science Teachers in High Need Schools
Allison L. Kirchhoff, University of Minnesota
Frances Lawrenz, University of Minnesota
Anica Bowe, University of Minnesota

S5.12.3 “If You Struggle, You Turn Away From It”: Finding Connections between Pre-service Elementary Teachers’ Struggles as Science Learners and Their Orientations to Science Teaching and Learning
Rachel E. Wilson, The University of Georgia
Julie M. Kittleson, The University of Georgia

S5.12.4 Cognitive and Attitudinal Predictors Related to Line Graphing Achievement among Pre-Service Elementary Teachers
Sebastian Szyjka, Central Michigan University
Frackson Mumba, Southern Illinois University Carbondale
Kevin Wise, Southern Illinois University Carbondale

S5.13 SC-Paper Set: Literacy and Elementary Science Education
4:30pm – 6:00pm, Conference Room 408
Presider: Larry D. Yore, University of Victoria

S5.13.1 Exploring Connections between Learning Science and Mathematics Content and English Language Acquisition: A Literacy Framework for English Language Learners
David J. Carrejo, University of Texas at El Paso
Judy Reinhartz, University of Texas at El Paso

S5.13.2 Integrating Literacy into Elementary Science: Moving from Questions and Challenges to Solutions and Successes
Jerine M. Pegg, University of Alberta

S5.13.3 Combining Research and Practice to Investigate What Young Children Know and Can Do in Science
Robert A. Williams, University of Texas at Austin
Mary E. Hobbs, University of Texas at Austin
James P. Barufaldi, University of Texas at Austin

S5.13.4 Evidence-Based Practice in Science Literacy for All: A Case Study of NSTA Articles as Self-Directed Professional Development
Larry D. Yore, University of Victoria
Susan Jagger, University of Toronto

S5.14 SC-Paper Set: Developing Reform-Based Science Curriculum Materials
4:30pm – 6:00pm, Conference Room 410
Presider: Joseph S Krajcik, University of Michigan
S5.14.1 Curriculum Coherence: A Three Year Study of Middle School Students Understanding of Chemical Concepts
Joi Merritt, University of Michigan
Kathryn F. Drago, University of Michigan
LeeAnn M. Sutherland, University of Michigan
Joseph S Krajcik, University of Michigan

S5.14.2 Local Instructional Design in High School Science: A Distributed Leadership Perspective on the Practice of Curriculum Innovation and Adaptation
Matthew A. Clifford, Learning Point Associates

S5.14.3 Stuck in the Margins? The Place of STSE Themes in Québec Junior High School Textbooks
David I. Waddington, Concordia University
Amanda Imbriglio, Concordia University
Kamran Sheikh

S5.14.4 Comparing Children’s Simple Machines Learning in LEGO-Engineering Design-Based and Non-LEGO Engineering Design-Based Science Environments
Kathleen G. Connolly, Tufts University
Kristen Bethke Wendell, Tufts University - Center for Engineering Education and Outreach (CEEO)
Linda Jarvis, Tufts University
Chris Rogers, Tufts University
Christopher G. Wright, Tufts University

S5.15 SC-Paper Set: Cultural Perspectives on the Science Pipeline in Middle and High School
4:30pm – 6:00pm, Conference Room 411
Presider:
Zahra Hazari, Clemson University

S5.15.1 Competing or Complementary? Home and School Identity Formation of Haitian Youth in South Florida
Neporcha T. Cone

S5.15.2 Sociocultural and School Contexts of High Performance: Finnish and South Korean Cases
Nam-Hwa Kang, Oregon State University
Miyoung Hong, Korea Institute of Curriculum & Evaluation
Jari Lavonen, University of Helsinki

S5.15.3 Gender, Socioeconomic Status and Race/Ethnicity Interactions for Factors Affecting Urban 12th Graders’ Aspirations to Major in Science in College
Hannah Sevian, University of Massachusetts Boston
Shiqi Hao, Michigan Department of Education
Marilyne Stains, University of Massachusetts Boston

S5.15.4 How Does Science Feel to High School Students? A Comparison by Gender and Subject Area
Jennifer A. Schmidt, Northern Illinois University

S5.16 Related Paper Set: Examining the Classroom Implementation of Using Geospatial Technologies to Teach Science
4:30pm – 6:00pm, Conference Room 412
Discussant:
Joseph Kerski, Environmental Systems Research Institute (ESRI)

S5.16.1 Understanding the Use of Geospatial Technologies to Teach Science: TPACK as a Lens for Effective Teaching
James G. McKinster, Hobart and William Smith Colleges
Nancy M. Trautmann, Cornell Lab of Ornithology

S5.16.2 Lonely Trailblazers: Examining the Early Implementations of Geospatial Technology in Science Classrooms
Tom Baker, Environmental Systems Research Institute (ESRI)
Joseph Kerski, Environmental Systems Research Institute (ESRI)

S5.16.3 Examining the Implementation of a Geospatial Information Technologies-supported Energy Unit in an Urban Middle School
Violet A. Kulo, Lehigh University
Alec M. Bodzin, Lehigh University
David J. Anastasio, Lehigh University
Tamara Peffer, Lehigh University
Dork O. Sahagian, Lehigh University
Lori Cirucci, Lehigh University

S5.16.4 What Happens After the Professional Development: Case Studies on Implementing GIS in the Classroom
Bob Kolvoord, James Madison University
Michael Charles, Pacific University
Steve Purcell, James Madison University

S5.17 SC-Paper Set: Ferment of Accountability: Leadership and Legal Issues
4:30pm – 6:00pm, Conference Room 415
Presider:
Gavin Fulmer, NSF
Lance E. King, Florida State University
Sherry A. Southerland, Florida State University

S5.17.2 A Principal’s Instructional Leadership in Science: What Factors Influence Teacher Acceptance of Instructional Change?
Kimberly S Lanier, Florida State University
Sherry A. Southerland, Florida State University

S5.17.3 Teachers Goals for Education and the Confluence of Beliefs, the National Reform Documents, and Accountability
Todd L. Hutner, The University of Texas at Austin
Sherry A. Southerland, Florida State University
Victor Sampson, Florida State University

S5.17.4 Support Programs for New Science Teachers Can Increase Student Test Scores: Policy Implications
Donna R. Sterling, George Mason University
Wendy M. Frazier, George Mason 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. We encourage all NARST members who are early in their professional career to attend this session.
6:15pm – 7:15pm, Conference Room 501
April Adams, Northeastern State University
Julia Grady, Arkansas State University

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.
6:15pm – 7:15pm, Salon D
Discussant:
Mary M. Arwater, University of Athens

Presenters:
Corinne Lardy, San Diego State University
Malcolm Butler, University of South Florida at St. Petersburg
Tonjua B. Freeman, University of Georgia
Alejandro Gallard, Florida State University
Nam-Hwa Kang, Oregon State University
Corinne Lardy, San Diego State University
Melody Russell, Auburn University

Strand 6: Science Learning in Informal Contexts
Symposium: Informal Science Education Research and Practice at NSF
6:00pm – 7:45pm, Conference Room 406
Presider:
Angela Calabrese Barton, Michigan State University

Presenters:
David A. Ucko, National Science Foundation
Sylvia M. James, National Science Foundation
Alphonse DeSena, National Science Foundation
Larry E. Suter, National Science Foundation
Angela Calabrese Barton, Michigan State University

JRST Editorial Board Meeting/Reception
Meeting is open to all, reception is invitation only.
7:00pm – 9:00pm, Salon C
Committee Meetings
7:00am – 8:15am

- Equity and Ethics Committee Meeting
  7:00am – 8:15am, Conference Room 402

- External Policy and Relations Committee Meeting
  7:00am – 8:15am, Conference Room 403

- Research Committee Meeting
  7:00am – 8:15am, Conference Room 404

- Membership and Election Committee Meeting
  7:00am – 8:15am, Conference Room 405

- International Committee Meeting
  7:00am – 8:15am, Conference Room 406

- Program Committee Meeting
  7:00am – 8:15am, Conference Room 407

- Publications Advisory Committee Meeting
  7:00am – 8:15am, Conference Room 408

- Outstanding Doctoral Research Award Committee Meeting
  7:00am – 8:15am, Conference Room 409

- NARST Outstanding Paper Award Selection Committee Meeting
  7:00am – 8:15am, Conference Room 410

- Early Career Research Award Selection Committee Meeting
  7:00am – 8:15am, Conference Room 411

- JRST Award Selection Committee Meeting
  7:00am – 8:15am, Conference Room 412

- Distinguished Contributions in Research Award Committee Meeting
  7:00am – 8:15am, Conference Room 413

Plenary Session
A European Perspective on Science Education: A Multi-National Challenge
8:30am – 10:00am, Salons E and F

Presider:
Dana L. Zeidler, University of South Florida

Presenter:
Doris Jorde, University of Oslo, Norway

Break
10:00am – 10:30am
TBD

Concurrent Session #6
10:30am – 11:45am

Strand 1: Science Learning, Understanding and Conceptual Change

S6.1 Poster Session
10:30am – 11:45am, Conference Room 401

- S6.1.1 Kindergarteners’ Idiosyncratic Representations of Linear Motion
  Jason Kahn, Tufts University

- S6.1.2 Students’ Conceptions of Heredity: Levels of Understanding
  Philipp Schmiemann, University of Duisburg-Essen
  Angela Sandmann, University of Duisburg-Essen

- S6.1.3 Crafted Experience: The Interplay between Manipulative Tools and Conceptual Learning in Science Classrooms
  Ji Shen, University of Georgia

- S6.1.4 Middle School Students’ Ideas about Transpiration and Stomata
  Jacqueline Wong, UCLA
  Melissa S Cook, UCLA
  Suna Ryu, UCLA
  William Sandoval, UCLA

- S6.1.5 Cognitive Architecture of Common and Scientific Concepts
  Paul Tarabek, College of Applied Economical Studies, Czech Republic
S6.1.6 Using Analogy and Model to Enhance Conceptual Change in Thai Middle School Students
Sittichai Wichaidit, Srinakharinwirot University, Thailand
Somsan Wongyounoi, Srinakharinwirot University, Thailand
Parin Chaiwisuthangkura, Srinakharinwirot University, Thailand
Precharn Dechsri, The Institute for the Promotion of Teaching Science and Technology, Thailand

S6.1.7 Revealing the Science Learner: Examining Middle School Students’ Use of Evidence in Revising Scientific Models
James A. Hagerty, University of Michigan
Elizabeth A. Davis, University of Michigan
Sarah Clowes, University of Michigan

S6.1.8 Using Open-Ended Questions to Diagnose Student Understanding of Inter- and Intramolecular Force
Patcharee Rompayom, Srinakharinwirot University, Thailand
Chinda Tambunichong, Srinakharinwirot University, Thailand
Somsan Wongyounoi, Srinakharinwirot University, Thailand
Precharn Dechsri, The Institute for the Promotion of Teaching Science and Technology, Thailand

S6.1.9 Third Grade Elementary African American Students’ Views of the Nature of Science
Leon Walls, University of Vermont

S6.1.10 Facilitating Transfer as Students Solve Context-Based Physics Problem
Bijaya Aryal, Lake Superior State University

S6.1.11 Project-Based Science and the Driving Question: Supporting Students as they Make Connections Between Science Content and Everyday Life
Nonye M. Alozie, University of Michigan, Consuelo Morales, University of Michigan
Jennifer Eklund

S6.2 Poster Session
10:30am – 11:45am, Conference Room 402

S6.2.1 Effects of a Collaborative Learning Model vs. a Traditional Apprenticeship Model on Undergraduate Student Self-Efficacy and Achievement during a Summer Research Experience
Shari L. Britner, Bradley University
Phillip Gagne, Georgia State University
Melissa K. Demetrikopoulou, Institute for Biomedical Philosophy
Karen L. Falkenberg, Concept Catalysts, Inc.
John L. Pecore, Wake Forest University
Brian A. Williams, Georgia State University
Laura L. Carruth, Georgia State University
Chris Goode, Georgia State University
Robert L. DeHaan, Emory University
Kyle J. Frantz, Georgia State University

S6.2.2 Students’ Views of a Project-Based Elementary Science Intervention
Lucy Avraamidou, University of Nicosia, Cyprus
Maria Evagorou, University of Nicosia, Cyprus

S6.2.3 Using Photographs in Discussion-Oriented Pedagogy for the Concepts of Day-Night and Cause of Seasons
Hyunju Lee, University of Massachusetts Amherst
Allan Feldman, University of South Florida

S6.2.4 Hands-On and Online: Student Experiential in a Distance Learning Environment
Mary V. Mawn, SUNY Empire State College

S6.2.5 Reading Scientifically: Practices Supporting Intertextual Reading Using Science Knowledge
Mark T. Enfield, Elon University

S6.2.6 Occupational Orientation – A Foreign Concept to Chemistry Lessons
Nina Bertels, Freie Universität Berlin Didaktik der Chemie Taku
Claus F. Bolte, Freie Universität

S6.2.7 The Impact of Epistemological Beliefs on Scientific Reasoning among College Science Students: Comparing Two Epistemology Assessments
Ava A. Zeineddin, Wayne State University
Fouad Abd-El-Khalick, University of Illinois at Urbana-Champaign

S6.2.8 Learning in the Prairie: Using Fieldwork Experiences to Promote Understanding of Ecological Concepts
Meredith L. Beilfuss, Butler University
Li-Ling Yang, Roger Williams University
S6.2.9 Expressions of Student Agency in the Context of a Climate Change Curriculum: Possibilities and Challenges
Azza Sharkawy, Queen’s University
Richard Reeve, Queen’s University

S6.2.10 Analyzing Science Argumentation in a Knowledge Building Environment
Jennifer Yeo, Nanyang Technological University
Yew-Jin Lee, National Institute of Education, Nanyang Technological University

S6.2.11 Cross-sectional Study on Conception and Perception of Evolution According to Creationism Concern
Minsu Ha, The Ohio State University
Heeyoung Cha, Korea National University of Education
Seulae Ku, Korea National University of Education

Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies
S6.3 Poster Session
10:30am – 11:45am, Conference Room 403

S6.3.1 Exploring Elementary Science Teachers’ Perceived Self-Efficacy toward Pedagogical Content Knowledge for Science Teaching
Ying-Tien Wu, National Taichung University, Taiwan

S6.3.2 Books and Stories in Children’s Science. The Findings of the BASICS Project
John F. McCullagh, Stranmillis University College
Belfast Northern Ireland
Glenda A. Walsh, Stranmillis University College
Belfast Northern Ireland
Julian G. Greenwood, Stranmillis University College
Belfast Northern Ireland

S6.3.3 Examining Elementary Science Teacher Identity through Science Notebooks: A Case Study of Three Exemplar Teachers
Lauren P. Madden, North Carolina State University
Eric N. Wiebe, North Carolina State University
John C. Bedward, North Carolina State University
James Minogue, North Carolina State University
Michael Carter, North Carolina State University

S6.3.4 Introducing an Elementary Atomic Model to Primary Education (Sixth Grade) – Maintaining the Particulate Perspective, but also Introducing the Concept of Electron Cloud
Georgios Tsaparlis, University of Ioannina
Paraskevi Dalaouti, Primary State Education, Ioannina, Greece

S6.3.5 The Scientific Thinker Project: A Design-based Research Study of Teaching and Learning Concepts of Evidence and Nature of Scientific Evidence in Primary School
Susan A. Kirch, New York University
Ranyee Chiang, New York University
Christine Coughlin, New York University
Sanaz Farhangi, New York University
Kara McKeown, New York University
Catherine E. Milne, New York University
Anna Stetsenko, CUNY

S6.3.6 Influences on Pre-Service Elementary Science Teaching Self-Efficacy: A Professional Development School Collaboration Pilot Study
Lara K. Smetana, Southern Connecticut State University

S6.3.7 Understanding Taiwanese Elementary Science Teachers’ Professional Conceptions, Competencies, and Needs
Sheau-Wen Lin, National Pingtung University of Education
Kuo-Yao Huang, National Pingtung University of Education
Jing-Ru Wang, National Pingtung University of Education
Huey-Lien Kao, National Pingtung University of Education

S6.3.8 The Use of Analogies in the Topic “The Food is a Source of Energy” in Textbooks and by Primary Teachers
Hílda G. Álvarez-Díaz, Cinvestav DIE-Unidad Monterrey
Adrianna Gómez-Galindo, Cinvestav Unidad Monterrey
Huang Xiang, Cinvestav Metodología de la Ciencia

S6.3.9 Navajo and Anglo Students’ Perceptions of Their World: Implications for Classroom Practice
Rebecca M. Monhardt, Loras College Education

S6.3.10 The Vision of the NSES and the Vignettes from Classrooms
Eun Kyung Ko, National-Louis University
Byoung S Kim, Roosevelt University
Norman G. Lederman, Illinois Institute of Technology

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies
S6.4 Poster Session
10:30am – 11:45am, Conference Room 404

S6.4.1 Exploring Novice Teachers’ Reflective Practices of Lifeworld Consideration
Miyoun Lim, Georgia State University
John L. Pecore, Wake Forest University
S6.4.2 Teachers’ Use of Visual Representations in the Science Classroom
Michelle Cook, Clemson University

S6.4.3 Forging the Relationship to Science Content for Adolescents in Problem-Based Science
Gayle A. Buck, Indiana University
Amy E. Trauth-Nare, Indiana University
Kristin L. Cook, Indiana University

S6.4.4 Preservice Secondary Science Teachers’ Understanding of Testing Hypotheses
Byoung S Kim, Roosevelt University
Yeon-A Son, Dankook University
Seok Jun Hong, Dankook University

S6.4.5 Teachers’ Practical Arguments in a Professional Discourse Community
David J. Grueber, Wayne State University
Shamarion Green, Wayne State University

S6.4.6 Design, Implementation, and Assessment of a Geospatial Science-Technological Pedagogical Content Knowledge Professional Development Model
Tamara Peffer, Lehigh University
Alec M. Bodzin, Lehigh University
Violet A. Kulo, Lehigh University
Dork O. Sahagian, Lehigh University
David J. Anastasio
Lori Cirucci, Bethlehem School District

S6.4.7 Evaluation of Children’s Literature
Vincent Amodeo

S6.4.8 Lessons Designed To Test Relative Effectiveness of Inquiry VS Direct Instruction
Betty Adams, Western Michigan University
Adriana Undreiu, University of Virginia’s College at Wise
David Schuster, Western Michigan University
William Cobern, Western Michigan University

S6.4.10 Examining the Impacts of the Science Writing Heuristic (SWH) Approach on 7th Grade Students’ Achievements on Summary Writing and Oral Argumentation Tasks
Jeonghee Nam, Pusan National University
Brian Hand, University of Iowa
Kyunghwa Kwak, Pusan National University
Aeran Choi, Kent State University

S6.4.3 Forging the Relationship to Science Content for Adolescents in Problem-Based Science
Gayle A. Buck, Indiana University
Amy E. Trauth-Nare, Indiana University
Kristin L. Cook, Indiana University

S6.4.4 Preservice Secondary Science Teachers’ Understanding of Testing Hypotheses
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S6.4.4 Preservice Secondary Science Teachers’ Understanding of Testing Hypotheses
Byoung S Kim, Roosevelt University
Yeon-A Son, Dankook University
Seok Jun Hong, Dankook University

S6.4.5 Teachers’ Practical Arguments in a Professional Discourse Community
David J. Grueber, Wayne State University
Shamarion Green, Wayne State University

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Alec M. Bodzin, Lehigh University
Violet A. Kulo, Lehigh University
Dork O. Sahagian, Lehigh University
David J. Anastasio
Lori Cirucci, Bethlehem School District

S6.4.7 Evaluation of Children’s Literature
Vincent Amodeo

S6.4.8 Lessons Designed To Test Relative Effectiveness of Inquiry VS Direct Instruction
Betty Adams, Western Michigan University
Adriana Undreiu, University of Virginia’s College at Wise
David Schuster, Western Michigan University
William Cobern, Western Michigan University

S6.4.10 Examining the Impacts of the Science Writing Heuristic (SWH) Approach on 7th Grade Students’ Achievements on Summary Writing and Oral Argumentation Tasks
Jeonghee Nam, Pusan National University
Brian Hand, University of Iowa
Kyungwa Kwak, Pusan National University
Aeran Choi, Kent State University

S6.5 Poster Session
10:30am – 11:45am, Conference Room 405
Presider:
Leslie Atkins, California State University, Chico

S6.5.1 Biochemistry Students’ Thinking about Nucleic Acids as Revealed by Reading Questions
Sarah Hjelseth, North Dakota State University
Erika G. Offerdahl, North Dakota State University
Lisa M. Montplaisir, North Dakota State University

S6.5.2 A Longitudinal Study of Undergraduates’ Science Literacy: Exploring Responses to Policy-Driven Survey Items
Sanlyn R. Buxner, University of Arizona
Jessie C. Antonellis, University of Arizona
Chris D. Impey, University of Arizona

S6.5.3 Learning to Write in Undergraduate Chemistry: The Impact of Argument-Driven Inquiry
Victor Sampson, Florida State University
Joi P. Walker, Tallahassee Community College
Katrina Dial, Florida State University
Jon Swanson, Florida State University
Tuesday, March 23, 2010

S6.5.4 An Investigation of the Development of University Students’ Science Process Skills and Reasoning Ability Through a Process-Oriented Chemistry Laboratory Curriculum
Eulsun Seung, Indiana State University
Beverly Pestel, Indiana State University
Aeran Choi, Kent State University

S6.5.5 Evolution Acceptance and Epistemological Views of College Biology Students
Lisa A. Donnelly, Kent State University

S6.5.6 The Interaction of Who and Where You Are: How Context Interacts with Belief to Influence Undergraduate Faculty Members Engagement with Reform
Patrick Enderle, Florida State University

S6.5.7 Student Perceptions of the Role of College General Education Biology on their Learning: Comparing Problem-based Learning and Traditional Expository Instructional Models
John S Peters, College of Charleston
Steve Fifield, University of Delaware
S6.5.8 Exploring the Reading of the Uncertain Science Issue: An Eye Movement Approach  
Fang-Ying Yang, National Taiwan Normal University  
I-Ju Tsai, National Taiwan Normal University

S6.5.9 Content in Evolution-Selective Traditions in Teacher Reasoning on Educational Content for Upper Secondary School  
Maria I. Petersson, Dalarna University, Sweden

S6.5.10 Beginning Chemistry College Students Notions of Basic Quantum Chemistry Concepts: A Qualitative Study with Concept Mapping as Qualitative and Quantitative Analytic Tool  
Christina D. Stefani, Lykeion Anavriton Athens Greece  
Georgios Tsaparlis, University of Ioannina Greece

S6.5.11 Faculty Grading of Quantitative Problems: Are Values Consistent with Practice?  
Heather L. Petcovic, Western Michigan University  
Herb Fynnewever, Calvin College  
Charles Henderson, Western Michigan University  
Jacinta M. Mutambuki, Western Michigan University  
Jeffrey A. Barney, Western Michigan University

S6.5.12 Issues Effecting African American Students in Science Majors at Predominantly White Universities  
Andre M. Green, University of South Alabama  
George E. Glasson, Virginia Tech  
Brenda R. Brand, Virginia Tech

S6.6.4 Free-choice Family Learning Experiences at Telescope Observing Events  
Matthew C. Wenger, University of Arizona  
Christopher J. Harris, SRI International  
Kathy Carter, University of Arizona

S6.6.5 Exploring Middle School Students’ Sense of Place and Engagement in Science Learning  
Deborah E. Peck, University of New Brunswick  
Karen S Sullenger, University of New Brunswick

S6.6.6 Car Cards for Carbon: Can Light Rail Mass Transit be Used to Teach Riders Science?  
David S Lustick, University of Massachusetts Lowell  
Jill H. Lohmeier, University of Massachusetts Lowell

S6.6.7 The Importance of Visual Materials for Educating Latino Farmworkers About Pesticide Risks  
Catherine E. LePrevost, North Carolina State University  
Margaret R. Blanchard, North Carolina State University  
Julia F. Storm, North Carolina State University  
Cesar R. Asuaje, University of Florida  
Gregory Cope, North Carolina State University

S6.6.8 Utilizing Reflective Practice and Coaching Techniques in a Formal-Informal Education Partnership for Constructivist Science Teacher Preparation  
Laura Saxman, CUNY  
Barbara Schroder, CUNY  
Preeti Gupta, The New York Hall of Science

S6.6.9 Atom Surprise: Science Theater under Investigation  
Ayelet Baram-Tsabari, Technion, Israel  
Ran Peleg, Technion, Israel

S6.6.10 Patterns of Youth and Family Interaction during Informal Science Activity: Implications for Learning Science In Formal and Informal Environments  
Leah A. Bricker, Loyola University Chicago  
Philip Bell, University of Washington

S6.6.11 Public Engagement with Science in Informal Science Education: An Analysis of Five Case Studies in Science Theatre  
Jane L. Lehr, California Polytechnic State University  
Ellen McCallie, Carnegie Museum of Natural History  
Robin Meisner, MIT Museum  
Cora Olson, Virginia Polytechnic Institute & State University  
John Durant, MIT Museum  
John H. Falk, Oregon State University  
Saul Halfon, Virginia Polytechnic Institute & State University  
Bruce Lewenstein, Cornell University  
Cynthia Needham, ICAN Productions  
Debra Wise, Underground Railway Theater

Strand 6: Science Learning in Informal Contexts  
S6.6 Poster Session  
10:30am – 11:45am, Conference Room 406  
**Presider:**  
James Kisiel, Cal State University Long Beach

S6.6.1 Science Fair Judges’ Perceptions of the Benefits of Student Participation and Mentoring  
Kathleen Fadigan, Pennsylvania State University

S6.6.2 A Case Study of Urban Student and Teacher Experiences Surrounding an Outdoor Environmental Science Field Trip  
Peggy L. Preusch, Towson University

S6.6.3 The Circularity of Teaching and Practice: Supporting Pre-Service Teachers by Removing Emotional Barriers to Quality Teaching in Informal Educational Environments  
Steven B. Chapman, University of London
S6.6.12 Using Cogenerative Dialogues in a Science Center
Preeti Gupta, New York Hall of Science
Correa H. Jennifer, New York Hall of Science

Strand 7: Pre-service Science Teacher Education
S6.7 Poster Session
10:30am – 11:45am, Conference Room 407

S6.7.1 Service Learning for Science Teacher Education: A Synthesis of Theory and Research
Carolyn S Wallace, Auburn University

S6.7.2 Aligning Preservice Teacher Knowledge about Models and Modeling with a Scientific Modeling Learning Progression
Barbara Hug, University of Illinois Urbana-Champaign
Tang Wee Teo, University of Illinois Urbana-Champaign

S6.7.3 The Role of Coteaching in Valuing and Using the Disturbances of Learning to Teach Science
Catherine E. Milne, NYU
Kathryn Scantlebury, University of Delaware
Jason Blonstein, NYU
Susan Gleason, Middletown High School Delaware

S6.7.4 Student-teachers Promoting Actions on Socioscientific Issues: Impetus from Their Science Inquiries
John L. Benze, OISE, University of Toronto
Gervase M. Bowen, Mount Saint Vincent University
Lyn Carter, Australian Catholic University, Melbourne, Australia

S6.7.5 From PCK to TPCK: Developing A Transformative Model of Pre-Service Science Teachers
Syh-Jong Jang, Chung-Yuan Christian University
Kuan-Chung Chen, Chung-Yuan Christian University

S6.7.6 Development of Science Pedagogical Content Knowledge: A Model Proposed for Elementary Teacher Education in Alberta
Saiqa Azam, University of Calgary, AB, Canada

S6.7.7 Using Video Reflection to Foster Pre-Service Science Teacher Reflection and Identity Development: Nicole’s Story
Maria S Rivera Maulucci, Barnard College, Columbia University

S6.7.8 Writing In Science: Developing Positive Attitudes and Pedagogical Knowledge in a Teacher Education Course
Isha DeCoito, York University
Shelley Peterson, University of Toronto

S6.7.9 Factors Mediating the Quality of Teacher Workforce: Finnish and South Korean Cases
Miyoung Hong, Korea Institute for Curriculum and Evaluation, South Korea
Nam-Hwa Kang, Oregon State University
Jari Lavonen, University of Helsinki, Finland

Nicola Scheid

S6.7.11 Confirmation of the Psychometric Properties of the Context-Modified Questionnaire of Attitude Toward Statistical Graphs (QASG) for Measuring Pre-service Teachers’ Attitudes Toward Line Graphs in Science (QALGS)
Sebastian Szyjka, Central Michigan University
Frackson Mumba, Southern Illinois University Carbondale
Kevin Wise, Southern Illinois University Carbondale

S6.7.12 Establishing and Diagnosing Prospective Teachers’ Diagnostic Competence
Claudia von Aufschnaiter, Justus Liebig University Giessen
Gabi Duebbelde, Justus Liebig University Giessen
Janine Cappell, Justus Liebig University Giessen
Marco Ennemoser, Justus Liebig University Giessen
Juergen Mayer, Justus Liebig University Giessen
Joachim Stiensmeier-Pelster, Justus Liebig University Giessen
Rudolf Straesser, Justus Liebig University Giessen
Anett Wolgast, Justus Liebig University Giessen

Strand 8: In-service Science Teacher Education
S6.8 Poster Session
10:30am – 11:45am, Conference Room 408

S6.8.1 School Culture: Understanding the Interaction between School Culture and Beginning Science Teachers’ Induction Experiences
Yavuz Saka, Florida State University
Sherry A. Southerland, Florida State University
Barry W. Golden, Florida State University

S6.8.2 Entrepreneurial Leadership in STEM Teaching and learning (EnLiST) a Longitudinal Case Study
Anita M. Martin, University of Illinois
Fouad Abd-El-Khalick, University of Illinois
S6.8.3 Building an Online Community of Practice: A Pilot Study of the NASA Endeavor Fellows
Meghan E. Marrero, U.S Satellite Laboratory, Inc.
Jessica F. Riccio, Teachers College, Columbia University
Glen S Schuster, U.S Satellite Laboratory, Inc.

S6.8.4 The Role of Teacher Belief Systems and Classroom Discourse in the Interpretation of Reform-Based Instruction
Lynn M. Sikma, University of Illinois Urbana-Champaign

S6.8.5 Developing Secondary Science Teachers’ Knowledge of Adolescent Identity Development
M. C. Smith, Northern Illinois University
B. K. Kitts, Northern Illinois University
Penny Billman, University of Illinois College of Medicine

S6.8.6 What is Known about Mentoring in Support of Reform-Based Science Teaching
Thomas R. Koballa, University of Georgia
Leslie U. Bradbury, Appalachian State University

S6.8.7 Toward a Model of Effective Instructional Coaching in Science
Jim Minstrell, FACET Innovations, LLC
Eric Magi, Spokane School District
Cheryl Allendoerfer, FACET Innovations, LLC
Ruth Anderson, FACET Innovations, LLC

S6.8.8 Professional Development at the Cutting-Edge of Science: Teacher Experiences and Perspectives on Biotechnology Education
Jamie E. Mann, University of Florida
Troy D. Sadler, University of Florida

S6.8.9 Effectiveness of a Network-based Collaborative Professional Development Project on Teacher Professional Development: A case study
Kun-Yi Shih, National Changhua University of Education, Taiwan
Huey-Por Chang, National Changhua University of Education, Taiwan
Kuo-Hua Wang, National Changhua University of Education, Taiwan
Chien-Kuo Hsieh, National Changhua University of Education, Taiwan

S6.8.10 Using Structural Equation Modeling to explore the Relationships among Factors and Science Teachers’ Professional Competences
Ming-Liang Lin, National Kaohsiung Normal University, Kaohsiung, Taiwan
Ming-Jun Su, Shu-Te University, Taiwan
Jeng-Fun Hung, National Kaohsiung Normal University, Taiwan

S6.8.11 Changes in High School Chemistry Teacher Beliefs and Practice after a Professional Development Program
Ralph E. Spraker, South University
Christine R. Lotter, University of South Carolina
Greg Rushton, Kennesaw State University

S6.8.12 Engaging In-Service Teachers in Staff Development Through Model-Based Inquiry
Christopher A. Bogiages, Scholars Academy Conway, SC
Christine R. Lotter, University of South Carolina

Strand 9: Reflective Practice
S6.9 Poster Session
10:30am – 11:45am, Conference Room 409

S6.9.1 Successes and Frustrations of High School Students during Their First Experience with Student-Driven, Problem-Based Physics Instruction
Jeffrey C. Nordine, Trinity University

S6.9.2 Understanding High School Science Teachers’ Perceptions of Inquiry Teaching
Issam H. Abi-El-Mona
Sharon Blong

S6.9.3 How Does Being in a Journal Club Improve My Understanding of the Skills and Knowledge of Educational Research?
Karen A. Tallman, University of Massachusetts Amherst
Allan Feldman, University of South Florida

S6.9.4 Beginning the Development of SAPP: Self-Analysis Professional Portfolio
Philip Clarkson, Australian Catholic University
Lyn Carter, Australian Catholic University
Anne Scott, Australian Catholic University
Andrea McDonough, Australian Catholic University

S6.9.5 E-Portfolios as Portraits of Growth: Enacting Inquiry in an In-Service Chemistry Education Program
Rachel Ruggirello, Washington University in St. Louis
Wesley Pitts, Lehman College

Strand 10: Curriculum, Evaluation, and Assessment
S6.10 Poster Session
10:30am – 11:45am, Conference Room 410
Presider:
Joe Engemann, Brock University
S6.10.1 Inquiry Based Performance Assessment Tasks
Ann W. Wright, Canisius College
Joe Engemann, Brock University
Rodney Doran, State University of New York at Buffalo
Ethel Bournia-Petrou, Erie County Community College
Joe Zawicki, Buffalo State College
Gail Zichitella

S6.10.1 Comparative Analysis of the Presentation of the Nature of Science in U.S High School Biology and Korea High School General Science Textbooks
Young H. Lee, University of Houston
Eugene L. Chiappetta, University of Houston
Yeon-A Son, Dankook University
Seok Jun Hong, Dankook University

S6.10.2 Assessing Scientific Reasoning in a High School Classroom: The Translation of a Research Instrument into an Instructional Tool
Edward R. Geaney, University of California, Santa Cruz
Jerome M. Shaw, University of California, Santa Cruz

S6.10.3 Exploring a Science Teacher’s Assessment Beliefs and Practices through the Assessment Triangle Model
Edward R. Geaney, University of California, Santa Cruz

S6.10.4 Meta-Content Informal Formative Assessment and its Influence on Middle School Students’ Developing Science Knowledge
Joseph A. Brobst, University of Delaware
Eric M. Eslinger, University of Delaware

S6.10.5 Developing and Applying a Framework of Scientific Imagination and Measurement Scale for Scientific Imagination (MSI)
Jiyeong Mun, Ewha Womans University
Kongju Mun, Ewha Womans University
Sung-won Kim, Ewha Womans University

S6.10.6 Stakeholder Discourse Dynamics in an Elementary School Science Reform Effort
Meena M. Balgopal, Colorado State University
Shaun Cornwall, Shepardson Elementary School

S6.10.7 Investigating the Effectiveness of Design Method for Science Class Combined Two-Dimensional Teaching Method with One Page Portfolio Assessment: Grade Fourth Students Understanding of Phase Change
Koichi Furuya, Hokkaido University of Education, Japan
Tetsuo Hori, University Yamanashi, Japan

S6.10.8 Development of an Instrument to Assess Science Teachers’ Perceived Technological Pedagogical Content Knowledge
James G. McKinster, Hobart and William Smith Colleges
William J. Boone, University of Miami
Nancy M. Trautmann, Cornell Lab of Ornithology

S6.10.9 Designing and Using Simulation-based Assessments in Balanced State Assessment Systems
Matt Silberglitt, WestEd
Barbara C. Buckley, WestEd
Edys Quellmalz, WestEd

S6.10.10 Development of Attitudes toward Socioscientific Issues Scale
Mustafa S Topcu, Yuzuncu Yil University

S6.10.11 A Case Study of a Virtual High School Biology Curriculum using the National Science Education Standards and the Revised Bloom’s Taxonomy
Matthew E. Vick, University of Wisconsin-Whitewater

S6.10.12 Studying Evaluative Process: Critical Thinking around Observing Science Professional Development Workshops
Kristin Bass, Rockman et al
Sarah Mushlin, Rockman et al
Molly Reisman, Rockman et al

S6.10.13 EQUIP (Electronic Quality of Inquiry Protocol): A Valid Measure for Assessing Inquiry-Based Instruction
Jeff C. Marshall, Clemson University

Strand 11: Cultural, Social, and Gender Issues
S6.11 Poster Session
10:30am – 11:45am, Conference Room 411

S6.11.1 Teaching Students with Learning Disabilities in the General Education Science Classroom: Examining Middle Grades Science Teachers Instructional Practices
Marlene Morales, Florida State University
Sherry A. Southerland, Florida State University
Penny J. Gilmer, Florida State University

S6.11.2 Influences on the Evolution of a STEM Teacher in an Under-Resourced School: The Case of Andrew
Athena R. Ganchorre, University of Arizona
S6.11.3 Growth in Elementary Teachers’ Personal and Professional Beliefs about Diversity
Brian Fortney, University of Texas at Austin
Nancy Albrecht, University of Minnesota
Bhaskar Upadhyay, University of Minnesota

S6.11.4 The Effects of School Type, Grade Level and Gender on High School Students’ Metacognition
Sevda Yerdelen-Damar, Yuzuncu Yil University
Haksi Pesman, Firat University

S6.11.5 Investigating Parents’ View about Involvement in Their Children’s Education Through a Parental Science Learning Group
Yi-Ting Cheng, National Changhua University of Education
 Huey-Por Chang, National Changhua University of Education
 Wenyu Chang, National Changhua University of Education
 Jun-Yi Chen, National Chiayi University

S6.11.6 One Person Can Change a Village: The Differential Impact of Nutrition Education on Non-US Born Students and their Families
Penny M. Shumaker Jeffrey, North Carolina State University
Gail Jones, North Carolina State University

S6.11.7 Empowering English learners in the Science Classroom
Adelina V. Alegria, Occidental College

S6.11.8 From Tri-Cultural Conflict to Tri-Cultural Connection: How Successful Urban Science Educators Become Culturally Connected
Marlina N. Duncan, University of Massachusetts Amherst

S6.11.9 A Portrait of Middle Grades Science Teachers’ Beliefs about the Inclusion of Student with Learning Disabilities
Marlene Morales, Florida State University
Sherry A. Sootherland, Florida State University
Penny J. Gilmer, Florida State University

S6.11.10 Science as a Tool for Social and Economic Transformation: Exploring African American Students’ Experiences in an Early College of Health Science Academy
Julie L. Haun-Frank, The University of North Carolina at Greensboro

S6.11.11 ‘Strangers in a Strange Land’: Bridging the Gap between Preservice Early Childhood Teachers’
Valerie L. Akerson, Indiana University
Cary A. Buzzelli, Indiana University
Jennifer L. Eastwood

Strand 12: Educational Technology
S6.12 Poster Session
10:30am – 11:45am, Conference Room 412

S6.12.1 Tracing the Development of Crystal Island: Uncharted Discovery: An Intelligent Game-based Learning Environment
James Minogue, North Carolina State University
Bradford Mott, North Carolina State University
John Niefeld, North Carolina State University
Hiller Spires, North Carolina State University
James Lester, North Carolina State University
Marc Russo, North Carolina State University

S6.12.2 The Effect of Computerized Peer Assessment on Scientific Writing Achievement of Secondary School Peer Assessors
Cees Terlouw, Saxion University, The Netherlands
Floris B. Bos, University of Twente, The Netherlands
Albert Pilot, University Utrecht, The Netherlands

S6.12.3 Developing Ecological Stewardship in Elementary School through Student Participation in Virtual Worlds
Janice L. Anderson, University of North Carolina at Chapel Hill

S6.12.4 SURGE: Integrating Tacit and Formal Understanding of Mechanics in a Digital Game
Douglas B. Clark, Vanderbilt University
Brian C. Nelson, Arizona State University
Cynthia M. DAngelo, Arizona State University
Kent Slack, Arizona State University
Mario M. Martinez-Garza, Vanderbilt University
Muhsin Menekse, Arizona State University

S6.12.5 A System for High-throughput Capture of Assessment Data from Pilot Tests
Francis Molina, AAAS - Project 2061
George E. DeBoer, AAAS - Project 2061
Cari F. Herrmann-Abell, AAAS - Project 2061
Brian Sweeney, AAAS - Project 2061

S6.12.6 Evaluating the Potential Effects of Scaffolding Features on Student Learning of Science
Kasey L. McCall, University of Michigan
Namsoo Shin, University of Michigan
LeeAnn M. Sutherland, University of Michigan

S6.12.7 A Study of Achievement, Attitudes, and Motivation in a First-Year High School Chemistry Classroom Using an Audience Response System
Douglas G. Balmer, Warwick High School
S6.12.8 Racing into the 21st Century: Usability Testing Results from a Serious Educational Game
Leonard A. Annetta, North Carolina State University
Marta Klesath, North Carolina State University

S6.12.9 Embedding Assessment in Serious Educational Games: Impacting the Hawthorne Effect
Shawn Y. Holmes, North Carolina State University

S6.12.10 Assessing Post Serious Educational Game Attitudes through Naturalistic Inquiry
Meng-Tzu Cheng, National Chaio Tung University
Elizabeth Folta, North Carolina State University

Strand 13: History, Philosophy, and Sociology of Science
S6.13 Poster Session
10:30am – 11:45am, Conference Room 413
Presider:
Gerald Rau

S6.13.1 The Influence of Argumentation on Students’ Understandings of Nature of Science
Rola F. Khishfe, American University of Beirut
Saouma Boujaoude
Shannon Palouci
Todd Medintz

S6.13.2 Examining Professional Scientists’ Epistemological Views of Science
Elizabeth H. Redman, University of California, Los Angeles
William Sandoval, University of California, Los Angeles

S6.13.3 Facilitating Students’ Conceptual Understanding of Stoichiometry
Mansoor Niaz, Universidad de Oriente, Venezuela
Luis Montes, Escuela Tecnica de Pesca, Venezuela

S6.13.4 Exploring Ideas of Representation by Epistemological Language and Scientific Meta-Language in Hybrid Adapted Primary Literature
Marie-Claire Shanahan, University of Alberta

S6.13.5 Searching for Representations of Nature of Science in Middle and High School Textbooks Adopted in a Large Urban Public School District in Western United States
Hasan Deniz, University of Nevada Las Vegas
Cynthia L. Kern, University of Nevada Las Vegas
Thomas J. Bussey, University of Nevada Las Vegas
Kristoffer R. Carroll,

S6.13.6 Teaching the Conceptual History of Physics to Teachers
Charles Winnich, Boston University
Peter Garik, Boston University
Deb Nolan, School of Education, Boston University
Arthur Eisenkraft, University of Massachusetts Boston
Andrew Duffy, Boston University
Manher Jariwala, Boston University
Luciana Garabayo, Boston University
Nicholas Gross, Boston University

S6.13.7 Presentation of Atomic Structure in Turkish General Chemistry Textbooks
Bayram Costu, Karadeniz Technical University, Turkey
Mansoor Niaz, Universidad de Oriente, Venezuela

S6.13.8 Secondary School Students’ Conceptions of Theories and Evidence: The Development and Implementation of a Qualitative Instrument for Assessment
Andri Christodoulou, King’s College, London
Jonathan F. Osborne, Stanford University
Christina Howell-Richardson, King’s College, London
Katherine Richardson, Institute of Education
Shirley Simon, Institute of Education

Anne S. Wrigley Collins, University of California, Santa Barbara

S6.13.10 Using Popper’s 3-Worlds to Situate Meta-scientific (NOS) Knowledge
Jesse T. Bazzul, University of Toronto
John L. Bencze, University of Toronto

Strand 14: Environmental Education
S6.14 Poster Session
10:30am – 11:45am, Conference Room 414

S6.14.1 Assessing Extended Outdoor Experiences using FiNE Model for Learning in Nature
Tali Tal
Orly Morag

S6.14.2 Building Elementary Teachers’ Background Knowledge and Confidence Enriches Environmental Curriculum and Enhances Teaching and Learning
Penny J. Gilmer, Florida State University
Dawn Pack, Destin Elementary School
Cindy Phillips, Port St. Joe Elementary School
David B. Zandvliet, Simon Fraser University
Carlos G. Ormond, Simon Fraser University
Rekha B. Koul, Curtin University of Technology
Souraya Mansour, Royal Roads University

S6.14.4 Students Acting on Socioscientific Issues: Motivation from Their Science Inquiries
John L. Bencze, OISE, University of Toronto
Margaret Bent, University of Toronto
Erin Sperling, University of Toronto
Steve J. Alsop, York University

S6.14.5 The Effect of Facilitator on Environmental Knowledge Construction of Learners in Field-Based Collaborative Inquiry
Cihan Cihangir, Giresun University
Ozgul Yilmaz-Tuzun, Middle East Technical University

S6.14.6 Outdoor Education Centres and Place-Based Education: Paradigms and Possibilities
Gabriel R. Ayyavoo, OISE/University of Toronto
Erminia G. Pedretti, University of Toronto

S6.14.7 Teaching Identity in Environmental Education: The Pedagogic Roles Assumed by Environmental Educators And Their Impact On Teaching Practice
Patrick F. Dowd, University of California at Davis

S6.14.8 The Development of a Place-Based Learning Environment
Carlos G. Ormond
David B. Zandvliet
Susan Teed
Laura Piersol

S6.14.9 Muddying the Waters: Promoting Environmental Education through Practice-Theory
Erminia G. Pedretti, OISE, University of Toronto
Katherine Bellomo, University of Toronto

S6.14.10 A Climate Change Course for College Students
Younkyeong Nam, University of Minnesota
Emi Ito, University of Minnesota

S6.14.11 Seventh Graders’ Concepts and Ways of Reasoning about the Impact of Global Warming on Tornadoes and Hurricanes
Soyoung Choi, Purdue University
Daniel P. Shepardson, Purdue University

Strand 15: Policy
S6.15 Poster Session
10:30am – 11:45am, Conference Room 415

S6.15.1 Engaging STEM Faculty in K–20 Reforms—Implications for University Policies and Practices
Joseph McInerney, Westat
Xiaodong Zhang, Westat

S6.15.2 An Analysis of Science Achievement in Wisconsin’s Urban Charter Schools
Matthew E. Vick, University of Wisconsin-Whitewater

S6.15.3 From the Trenches: Understanding the Impact of Policy on Science Education in Rural Schools in the Black Belt Region of Georgia from the Teachers’ Perspective
Georgia W. Hodges, UGA

S6.15.4 Trends in Science Education Research Published in the Journal of Research in Science Teaching: A Longitudinal Policy Perspective
Michael R. Vitale, East Carolina University
Nancy R. Romance, Florida Atlantic University
Frank Crawley, East Carolina University

S6.15.5 Teachers’ Response to Reform: Attitudes and Practice of Inquiry-Oriented Instruction
Jeffrey D. Thomas, Central Connecticut State University
Ann Rivet, Teachers College, Columbia University

Awards Luncheon
12:00pm – 2:00pm
Salons E and F

Concurrent Session #7
2:15pm – 3:45pm

International Committee Sponsored Session
S7.1 Administrative Symposium: Research into Practice: Practice Informing Research
2:15pm – 3:45pm, Salon D

Presenters:
Mei-Hung Chiu, National Taiwan Normal University, Taiwan
Reinders Duit, IPN Kiel, Germany
Strand 1: Science Learning, Understanding and Conceptual Change
S7.2 SC-Paper Set: Knowledge Organization
2:15pm – 3:45pm, Conference Room 401
**Presider:**
Robert Louisell, St. Ambrose University

S7.2.1 Students’ Rating of Problem Similarity as a Measure of Problem-Solving Expertise
Frances A. Mateycik, Pennsylvania State University - Altoona
David H. Jonassen, University of Missouri - Columbia
N. Sanjay Rebello, Kansas State University

S7.2.2 Students’ Conceptions – Coherent or Fragmented? And what Difference Does it Make?
David E. Brown, University of Illinois at Urbana-Champaign

S7.2.3 Thinking Like a Scientist: Using Vee-Maps to Connect Scientific Process with Scientific Concepts
Christine M. Knaggs, University of Toledo
Rebecca M. Schneider, University of Toledo

S7.2.4 Using Knowledge Space Theory to Analyze Concept Maps in an Undergraduate Immunology Course
Laura A. Cathcart, University of Maryland
Mike Stieff, University of Maryland
Gili Marbach-Ad, University of Maryland
Ann C. Smith, University of Maryland
Kenneth A. Frauwirth, University of Maryland

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Strand 2: Science Learning: Contexts, Characteristics and Interactions
S7.3 SC-Paper Set: Language, Identity, and Epistemology Development in Science Learning
2:15pm – 3:45pm, Conference Room 402
**Presider:**
Alandeom W. Oliveira, SUNY Albany

S7.3.1 Engaging Underrepresented Students in Science through Authentic Investigation
Xenia S Meyer, Cornell University
Barbara A. Crawford, Cornell University

S7.3.2 Exploring Science Teaching and Learning with English Language Learners in Urban Settings
Gillian U. Bayne, Lehman College of the City University of New York
Romil Amin, Lehman College of the City University of New York

S7.3.3 Young African American Children’s Representations of Self, Science, and School: Making Sense of Difference
Maria Varelas, University of Illinois at Chicago
Justine M. Kane, University of Illinois at Chicago
Caitlin Wylie, University of Cambridge

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Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies
S7.4 SC-Paper Set: Inquiry Learning and Inquiry Teaching: Stories from the Classroom
2:15pm – 3:45pm, Conference Room 403
**Presider:**
Deborah Smith, Penn State University

S7.4.1 Hiring a Science Specialist to Improve Elementary Science Instruction is Just the Beginning: Supporting Schools to Maximize the Impact of Science Specialists
Wendy M. Frazier, George Mason University
Donna R. Sterling, George Mason University
Amy Bordeaux, George Mason University

S7.4.2 Emerging Science in Teachers: Trials and Successes
Diana C. Rice, Florida State University
Angela I. Canto, Florida State University
Sibel Kaya, Florida State University
Carol Connor, Florida State University

S7.4.3 Early Science Teaching and Students’ Achievement in Kindergarten and First-Grade
Refika Olgan, Middle East Technical University

S7.4.4 Teachers Managing Students’ Ideas, Questions, and Contributions in the Context of an Innovative Inquiry-Based Elementary Science Unit
Rachel S Phillips, University of Washington
Christopher J. Harris, SRI International
William R. Penuel, SRI International
Britte Cheng, SRI International
Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies

S7.5 SC-Paper Set: Developing Science Teachers’ Content Knowledge

2:15pm – 3:45pm, Conference Room 404

Presider:
Nader Wahbeh, University of Illinois at Urbana Champaign

S7.5.1 A Shadow Curriculum: How Would the Biology Syllabus Look if it was Written by Students?
Ayelet Baram-Tsabari, Technion, Israel
Galit Hagay, Technion, Israel

S7.5.2 New Tools for Investigating the Relationship between Teacher Content Knowledge and Student Learning
Sean Smith, Horizon Research, Inc.
Melanie J. Taylor, Horizon Research, Inc.

S7.5.3 “We are Taking their Brilliant Minds”: Exploring the Use of Linguistic Devices to Mark Expertise in a Scientist-Teacher Collaboration
Marie-Claire Shanahan, University of Alberta
Robert E. Bechtel, University of Alberta

S7.5.4 Teacher Responses to Assessments of Understanding of Water in Socio-Ecological Systems: A Learning Progressions Approach
Kristin L. Gunckel, University of Arizona
Beth Covitt, University of Montana
Charles W. Anderson, Michigan State University

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

S7.6 SC-Paper Set: Argumentation and Socioscientific Issues

2:15pm – 3:45pm, Conference Room 406

Presider:
Allan Feldman, University of South Florida

S7.6.1 Examining Images of Scientific Inquiry through the Lens of Teacher Classroom Argumentation
Ron Gray, Oregon State University
Nam-Hwa Kang, Oregon State University

S7.6.2 Socio-Scientific Issues – A Way to Improve Students’ Interest and Learning?
Britt Lindahl, Kristianstad University, Sweden
Margareta Ekborg, Malmö University, Sweden
Mikael Winberg, Umeå University, Sweden
Christina Ottander, Umeå University, Sweden
Maria Rosberg, Kristianstad University, Sweden
Eva Nyström, Umeå University, Sweden
Malin Ideland, Malmö University, Sweden
Claes Malmberg, Malmö University, Sweden
Agnete Rehn, Malmö University, Sweden

S7.6.3 Writing Differently about a Socioscientific Issue: Developing Students’ Scientific Literacy through the Writing of Hybridised Scientific Narratives
Louisa Tomas, James Cook University, Australia
Stephen M. Ritchie, Queensland University of Technology, Australia

S7.6.4 How Middle School Students and High School Students Evaluate the Arguments Found within Articles Written For the Popular Press: A Comparison Study
Leeanne K. Gleim, Florida State University
Victor Sampson, Florida State University
Melanie Hester, Florida State University
Kiesha Williams, Florida State University

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

S7.7 SC-Paper Set: Students’ Views and Beliefs in Undergraduate Biology and Biotechnology

2:15pm – 3:45pm, Conference Room 405

Presider:
Kristy L. Halverson, University of Southern Mississippi

S7.7.1 Exploring Student Generated Questions using Media and Self-selected Science Information in an Undergraduate Non-science Major’s Biology Course
Michele A. Snyder, Clinton Community College

S7.7.2 “Genetically Modified Foods are the Only Foods that have DNA”: Epistemological Beliefs and Conceptual Understanding in a Non-Majors Biotechnology Course
Carina M. Rebello, University of Missouri - Columbia
Marcelle A. Siegel, University of Missouri - Columbia
Sharyn K. Freyermuth, University of Missouri - Columbia
Bruce A. McClure, University of Missouri - Columbia
S7.7.3 Pre-Service Elementary Education Students’ Scientific Content Knowledge of Biotechnology and Its Implications for Teaching and Learning
Brandy A. Skjold, Western Michigan University
Renee’ Schwartz, Western Michigan University
Carrie McKean, Western Michigan University

S7.7.4 Undergraduate and Teaching Assistant Nature of Science Understanding in an Explicit / Reflective Biology Laboratory
Elisabeth E. Schussler, University of Tennessee
Nanu U. Bautista, Miami University
Melanie A. Link-Perez, SUNY College at Oneonta

Strand 6: Science Learning in Informal Contexts & Strand 14: Environmental Education Co-Sponsored
S7.8 Symposium: Beyond Citizen Science: Science Learning and Public Participation in Environmental Research
2:15pm – 3:45pm, Conference Room 414
Discussants:
Carol Brandt, Virginia Polytechnic Institute and State University
Jennifer Shirk, Cornell Lab of Ornithology Ithaca, NY
Rebecca Jordan, Rutgers
Heidi L. Ballard, University of California at Davis
Terry M. Tomasek, Elon University

Strand 7: Pre-service Science Teacher Education
S7.9 SC-Paper Set: Pre-Service Teachers’ Knowledge of Content and Students
2:15pm – 3:45pm, Conference Room 407
Presider:
Tom J. McConnell, Ball State University

S7.9.1 Depicting a Comprehensive Picture of Science Teacher’s PCK: A Theoretical Model
Saiqa Azam, University of Calgary, AB, Canada
HsingChi von Bergmann, University of Calgary, Canada

S7.9.2 Finding Connections between Pre-service Elementary Teachers’ Understandings of Science and Mathematics Teaching and Learning
Julie M. Kittleson, University of Georgia
Rachel E. Wilson, University of Georgia
Amber Jarrard, University of Georgia

S7.9.3 Teaching Science as Argument: Prospective Elementary Teachers’ Knowledge
Reizelie Barreto, Towson University
Carla Zembal-Saul, The Pennsylvania State University

S7.9.4 Integrating ICT into the Science Curriculum: Teacher Knowledge (TPACK) and Strategies to Support K-8 Science Skills and Concepts
Candace B. Figg, Brock University
Kamini Jaipal, Brock University

Strand 8: In-service Science Teacher Education
S7.10 SC-Paper Set: Teacher-Scientist Collaborations
2:15pm – 3:45pm, Conference Room 408
Presider:
Kalani J. Eggington, QU

S7.10.1 How Research Experiences for Teachers (RET’S) Effect Science Teachers’ Knowledge, Beliefs and Practices
Barry W. Golden, Florida State University
Patrick Enderle, Florida State University
Yavuz Saka, Florida State University
Sibel Uysal, Florida State University

S7.10.2 A Study of Teacher-Scientist Collaboration Settings
Kalani J. Eggington, The University of Queensland, Australia

S7.10.3 The Impact of Scientist Mentors on Science Teachers’ Perceptions of Scientists and Understanding of Science
Roxanne Hughes, Florida State University
Pat Dixon, Florida State University
Barry W. Golden, Florida State University
Jose Sanchez, Florida State University

S7.10.4 Development of Teachers as Scientists in a Research Experiences for Teachers Program
Lisa C. Benson, Clemson University
Emily G. Medders, Southern Wesleyan University
Cheryl P. Cass, Clemson University

Strand 8: In-service Science Teacher Education
S7.11 Related Paper Set: The Effect of Professional Development on Teachers’ Knowledge, Skills, and Classroom Implementation and Their Students’ Ability to Write Scientific Explanations
2:15pm – 3:45pm, Salon C
S7.11.1 The Effect of Context and Activities on Teachers’ Scientific Explanations
Dale R. Baker, Arizona State University
Nievita Bueno Watts, Arizona State University
Gita Perkins, Arizona State University
Tapati Sen, Arizona State University
Elizabeth B. Lewis, University of Nebraska-Lincoln
Michael G. Lang, Maricopa Community College
District Offices

S7.11.2 Growth in High School English Teachers’ Understanding of the Science Concept of Energy
Gita Perkins, Arizona State University
Dale R. Baker, Arizona State University
Nievita Bueno Watts, Arizona State University
Michael G. Lang, Maricopa Community Colleges
District Offices

S7.11.3 Improving High School Teachers’ Content Knowledge of Energy in Systems Through Research-based Professional Development
Nievita Watts, Arizona State University
Dale R. Baker, Arizona State University
Steven Semken, Arizona State University
Michael G. Lang, Maricopa Community Colleges
District Offices

S7.11.4 The Effect of Implementing the CISIP Model on Students’ Scientific Explanations
Tapati Sen, Arizona State University
Nievita Bueno Watts, Arizona State University
Gita Perkins, Arizona State University
Dale R. Baker, Arizona State University
Michael G. Lang, Maricopa Community Colleges
District Offices

S7.11.5 Modeling Teacher Professional Development and Classroom Implementation of Instructional Strategies For Building Scientific Classroom Discourse Communities
Elizabeth B. Lewis, University of Nebraska
Dale R. Baker, Arizona State University
Brandon Helding, Arizona State University
Michael G. Lang, Maricopa Community Colleges
District Offices

S7.12 Related Paper Set: Pedagogical Content Knowledge for Teaching the Nature of Science
2:15pm – 3:45pm, Conference Room 409

S7.12.1 Developing PCK for NOS through Self-Study
Deborah L. Hanuscin, University of Missouri

S7.12.2 Developing PCK for NOS: Making Instruction Explicit
Deepika Menon, University of Missouri
Stephen B. Witzig, University of Missouri
Tina M. Roberts, University of Missouri

S7.12.3 Anticipating Student Questions: A Self-Study Approach to Develop PCK for teaching Theory and Law
Emily M. Walter, University of Missouri
Andrew West, University of Missouri

S7.12.4 Developing PCK for NOS: A Self-Study of the Use of Concept Mapping to Assess NOS
Dominike Merle-Johnson, University of Missouri
Nattida Promyod, University of Iowa
Ya-Wen Cheng, University of Missouri

S7.12.5 Developing PCK for NOS: Strategies for Probing Students’ Ideas about Subjectivity in Science
Jennifer Lacy, University of Missouri
Deborah L. Hanuscin, University of Missouri

S7.13 SC-Paper Set: Assessing Teachers’ Knowledge, Beliefs and Practices
2:15pm – 3:45pm, Conference Room 410

Presider:
Joe Engemann, Brock University

S7.13.1 Statewide Assessment Data in Pre-service and In-service Teacher Preparation
Joe Zawicki, State University College at Buffalo
Laura Dustin, Honeoye Central School District
David Henry, State University College at Buffalo
Timothy Johnson, Western New York Regional Information Center (WNYRIC)

S7.13.2 Assessing Teacher Science Content Knowledge: Measurement Sensitivity to a Physics Course Intervention
Thomas R. Tretter, University of Louisville
S7.13.3 Investigating the Influence of Teachers’ Orientations toward Curriculum Materials on Enactment
Meredith Houle, San Diego State University
Michelle Nolasco, San Diego State University
Katherine L. McNeill, Boston College

S7.13.4 Investigating Teacher Impact on Student Inquiry Science Learning Using a Hierarchical Linear Model
Ou Lydia Liu, Educational Testing Service
Hee-Sun Lee, Tufts University
Marcia Linn, UC Berkeley

S7.13.5 Exploring Patterns in Student Reports of Classroom Instruction
Gavin Fulmer, National Science Foundation
Ling L. Liang, La Salle University

Strand 11: Cultural, Social, and Gender Issues
S7.14 SC-Paper Set: Dialogues, Discourses, And Children: Cogenerating Science in the Everyday World
2:15pm – 3:45pm, Conference Room 411
Presider: Gale Seiler, McGill University

Cassie F. Quigley, Indiana University
Gayle A. Buck, Indiana University

S7.14.2 Young People’s (Grade 4/5) Aspirations and Interest in Science
Louise Archer, King’s College London
Jennifer DeWitt, King’s College London
Justin Dillon, King’s College London
Jonathan F. Osborne, Stanford University
Billy Wong, King’s College London

S7.14.3 Children’s Learning about Water through Discourse-in-Interaction
Charles Max, University of Luxembourg
Christina A. Siry, University of Luxembourg
Gudrun Ziegler, University of Luxembourg

S7.14.4 Connecting Urban Students to Science: The Importance of Building Social Capital and Enacting Reality Pedagogy
Sheila I. Borges, Teachers College, Columbia University
Alissa Berg, Teachers College, Columbia University
Tanzina Taher, Teachers College, Columbia University
Christopher Emdin, Teachers College, Columbia University

Strand 12: Educational Technology
S7.15. SC-Paper Set: Examining Classroom Contexts and On-Line Learning Environments
2:15pm – 3:45pm, Conference Room 412
Presider: Gary Hoban, University of Wollongong

S7.15.1 Technology Mediated Teacher Student Interactions and Classroom Discourse
Sibel Uysal-Bahbah, Florida State University
Colleen Megowan-Romanowicz, Arizona State University
David A. Birchfield, Arizona State University
Mina C. Johnson-Glenberg, Arizona State University

S7.15.2 Project PEER: Supporting Teachers and Students in a Virtual Community of Learners
Rodelyn P. Stoeber, St. Boniface College
Brian Lewthwaite, University of Manitoba

S7.15.3 The Development and Structure of Student Communities in the Secondary Blended Learning Science Classroom
Jonathan B. Crymes, The University of Georgia

S7.15.4 Examining Argument Structures Developed by Students Engaging in Online Discussion on Inquiry Investigations
Aeran Choi, Kent State University
Brian Hand, University of Iowa
Lori Norton-Meier, University of Louisville

Strand 12: Educational Technology
S7.16 Administrative Symposium: Investigating Virtual Learning Environments in STEM Education
2:15pm – 3:45pm, Conference Room 501
Discussant: Yasmin Kafi, University of Pennsylvania
Presenters:
Robb Lindgrenn, Stanford University
Melissa Gresalfi, Indiana University
Chris Dede, Harvard University
Keisha Varma, University of Minnesota
Concurrent Session #8
4:00pm – 5:30pm

Strand 1: Science Learning, Understanding and Conceptual Change
S8.1 SC-Paper Set: Scientific and Technological Understanding
4:00pm – 5:30pm, Conference Room 401

Presider:
Samson M. Nashon, University of British Columbia

S8.1.1 The Role of Metaconceptual Awareness in the Change and the Durability of Conceptual Understandings
Mesut Sackes, The Ohio State University
Kathy Cabe Trundle, The Ohio State University

S8.1.2 Recognizing and Applying the Explanatory Power of Pivotal Scientific Theories in the Science Classroom
Kevin D. Cunningham, University of Wisconsin - Madison

S8.1.3 Children’s Learning about Materials Science through Engineering-Design-Based Instruction
Kristen B. Wendell, Tufts University
Hee-Sun Lee, Tufts University Department of Education

S8.1.4 Research on Undergraduate Students’ Understanding of Nanoscience and the Development of a Nanoscience Concept Inventory
Alan K. Szeto, Purdue University
George M. Bodner, Purdue University

Strand 2: Science Learning: Contexts, Characteristics and Interactions
S8.2 Symposium: Perspectives on Authenticity in Secondary Science Education
4:00pm – 5:30pm, Salon D

Discussant:
Richard A. Duschl, Penn State University

Presenters:
Anat Yarden, Weizmann Institute of Science, Rehovot, Israel
Maria-Pilar Jimenez-Aleixandre, University of Santiago de Compostela, Spain
Clark A. Chinn, Rutgers University
Michiel van Eijck, Eindhoven University of Technology, The Netherlands
Hadas Gelbart, Weizmann Institute of Science, Israel
Beatriz Bravo, University of Santiago de Compostela, Spain
Ravit Duncan, Rutgers
William J. Pluta, Rutgers
Strand 2: Science Learning: Contexts, Characteristics and Interactions
S8.3 SC-Paper Set: Contexts and Factors Influencing Students’ Science Attitudes and Interests
4:00pm – 5:30pm, Conference Room 402

Presider:
Sung-Tao Lee, Naval Academy, Taiwan

S8.3.1 Post-16 Participation in Physics: A Survey to Explore the Factors that Influence It
Fani Stylianidou, University of London
Tamjid Mujtaba, University of London
Michael Reiss, University of London
Bijan Riazi-Farzad, University of London

S8.3.2 Learning With Black-Box-Experiments
Gunnar Friege, Leibniz University, Germany

S8.3.3 An Investigation of Children’s Interested and not Interested Science Topics in Textbooks
Fu-Pei Hsieh, Kuang-Hua Primary School, Kaohsiung, Taiwan
Sung-Tao Lee, Naval Academy

S8.3.4 Contextualization across Curricular Interpretations: A Case-Study of a Project-Based Learning Environment
Kathryn F. Drago, University of Michigan

Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies
S8.4 SC-Paper Set: Hearing From the Teachers: Their Thoughts on Inquiry Teaching
4:00pm – 5:30pm, Conference Room 403

Presider:
Karen Levitt, Duquesne University

S8.4.1 Examining the Beliefs and Practices of Two Effective Primary Science Teachers
Angela C. Fitzgerald, Edith Cowan University, Perth, Australia

S8.4.2 Teachers’ Voices on Integrating Metacognition into Science Education
Nir Orion, Weizmann Institute of Science
Adi Ben-david, Weizmann Institute of Science

S8.4.3 Exploring Primary Teachers’ Conceptions of Science Teaching: Implementing Inquiry Science Lessons
Uzma Khan, Syracuse University
Sharon Dotger, Syracuse University
Vicki McQuitty, Davis College

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies
S8.5 Related Paper Set: Teaching in Whole Class Discussion Mode: Teaching Strategies, Interactive Simulations, and Science Learning
4:00pm – 5:30pm, Conference Room 404

S8.5.1 Case Study of Teaching Strategies Used Before, During and After a Simulation to Scaffold the Development of a Visualizable Microscopic
Norman Price, University of Massachusetts-Amherst
Abi Leibovitch, University of Massachusetts-Amherst

S8.5.2 Supporting Students’ Construction of Mental Models for Electric Circuits: An Investigation of Teacher Moves Used in Whole Class Discussions
E. Grant Williams, School District 18, Fredericton, New Brunswick, Canada

S8.5.3 Small Group vs Whole Class Use of Interactive Computer Simulations: Comparative Case Studies of Matched High School Physics Classes
A. Lynn Stephens, University of Massachusetts-Amherst
John J. Clement, University of Massachusetts-Amherst
Ileana Vasu, University of Massachusetts-Amherst

S8.5.4 Computer Simulations to Teach Kinematics in Large and Small Group Settings: Achievement, Gender and Attitudes
Ileana Vasu, University of Massachusetts-Amherst
Renee C. Sweeney, Westfield High School, Massachusetts

Strand 5: College Science Teaching and Learning (Grades 13-20)
S8.6 SC-Paper Set: Inquiry-based Laboratory Experiences for Undergraduates
4:00pm – 5:30pm, Conference Room 405

Presider:
Michael Gleason, Georgia College and State University

S8.6.1 A Cross-Case Study on Implementing Inquiry-Based Laboratories at the University Level
Stephen B. Witzig, University of Missouri
Ningfeng Zhao, East Tennessee State University
Sandra K. Abell, University of Missouri
Frank J. Schmidt, University of Missouri
S8.6.2 Use of Self-Explanations in Chemistry Laboratory Reports: Supporting Student Procedural Understanding and Transitioning Laboratory Curricula
Andrea G. Van Duzor, Chicago State University

S8.6.3 Argument Driven Inquiry: An Instructional Model for Use in Undergraduate Chemistry Labs
Joi P. Walker, Tallahassee Community College
Jonathon Grooms, Florida State University
Brittany Anderson, Florida State University
Carol O. Zimmerman, Tallahassee Community College
Victor Sampson, Florida State University

Strand 6: Science Learning in Informal Contexts
S8.7 Symposium: Intersections of Science Education Research and Practice and Issues of Access, Equity, and Culture
4:00pm – 5:30pm, Conference Room 406
Discussants:
Sandra T. Martell, University of Wisconsin-Milwaukee
Leslie R. Herrenkohl, University of Washington
Doris Ash, University of California Santa Cruz
John H. Falk, Oregon State University
Jean Creighton, UWM Planetarium
Thao Mai, University of California Santa Cruz
Elizabeth R. Drame, University of Wisconsin-Milwaukee
Dale McCreedy, The Franklin Institute

Strand 7: Pre-service Science Teacher Education
S8.8 Related Paper Set: Transforming Science Teacher Education in Two Contexts (HBI and PWI): The Project Nexus Study (Years 1 – 4)
4:00pm – 5:30pm, Conference Room 407
Discussants:
Sharon J. Lynch, National Science Foundation/
George Washington University
Presider:
Mark D. Guy, University of North Dakota

S8.8.1 The Beliefs and Reported Science Teaching Practices of Newly Graduated Elementary and Middle School Education Majors
J. Randy McGinnis, University of Maryland
Gili Marbach-Ad, University of Maryland
Scott J. Dantley, Coppin State University
Rebecca Pease, University of Maryland
Amy H. Dai, University of Maryland

S8.8.2 Promoting Science for All by Way of Student Interest in Transformative Undergraduate Science Non-majors Courses in Historically Black Institution and Primarily White Institution
Gili Marbach-Ad, University of Maryland
J. Randy McGinnis, University of Maryland
Scott J. Dantley, Coppin State University
Spencer Benson, University of Maryland
Amy H. Dai, University of Maryland
Rebecca Pease, University of Maryland

S8.8.3 An Investigation of the Influence of an Informal Science Education Afterschool Internship in a Formal Science Education Teacher Preparation Program
Phyllis Katz, University of Maryland
Emily Hestness, University of Maryland
Kelly Riedinger, University of Maryland
J. Randy McGinnis, University of Maryland
Amy H. Dai, University of Maryland
Rebecca Pease, University of Maryland

S8.8.4 Transforming Elementary Science Teacher Education by Bridging Formal and Informal Science Education in an Innovative Science Methods Course
Kelly Riedinger, University of Maryland
Gili Marbach-Ad, University of Maryland
J. Randy McGinnis, University of Maryland
Emily Hestness, University of Maryland
Rebecca Pease, University of Maryland
Phyllis Katz, University of Maryland

Strand 8: In-service Science Teacher Education
S8.9 SC-Paper Set: Urban Science and Reform
4:00pm – 5:30pm, Conference Room 408
Presider:
Irene U. Osisioma, California State University

S8.9.1 An Earth Science Professional Development for Urban Teachers
Younkyeong Nam, University of Minnesota
John Oughton, University of Minnesota

S8.9.2 Challenges and Solutions of a Collaborative Science Professional Development in Urban Centers
Irene U. Osisioma, California State University
Dominguez Hills
Hedy Moscovici, California State University
Dominguez Hills

S8.9.3 Under The Fog of Science Education Reform: A Spotlight on Administrators
Rachel Ruggirello, Washington University
Sonya N. Martin, Drexel University
S8.9.4 Teaching Science in the City: Bridging Formal and Informal Science Learning Contexts with Preservice and Inservice Teachers
Maria S Rivera Maulucci, Barnard College, Columbia University
Jennie S Brotman, Barnard College, Columbia University

Strand 8: In-service Science Teacher Education
S8.10 Symposium: Understanding the Complex Nature of Professional Development Characteristics that Impact Large-Scale Science and Technology Projects
4:00pm – 5:30pm, Salon C
Discussants:
Susan A Yoon, University of Pennsylvania
Lei Liu, University of Pennsylvania
Sao-Ee Goh, University of Pennsylvania
Betty Chandy, University of Pennsylvania
Jorge Santiago-Aviles, University of Pennsylvania
James McGonigle, University of Pennsylvania
Kira Baker-Doyle, Penn State
Michael Schrlau, Temple University
Robert Johnson, Temple University
Dorothea Lasky, University of Pennsylvania

Strand 10: Curriculum, Evaluation, and Assessment
S8.11 SC-Paper Set: Implementation of Reform-Based Science Curriculum and Assessment
4:00pm – 5:30pm, Conference Room 410
Presider:
Gavin Fulmer, National Science Foundation

S8.11.1 Outdoor Learning Experiences Embedded in a Curricular Unit about The Local Environment: The Students’ Perspective
Molly L. Yunker, University of Michigan

S8.11.2 Comparing Student Achievement across Time in Contexts Using a Coherent Inquiry Curriculum Versus Those Using Traditional Curricula
Joseph S Krajcik, University of Michigan
LeeAnn M. Sutherland, University of Michigan
Sean Smith, Horizon Research, Inc.
Brian J. Reiser, Northwestern University
David Fortus, Department of Science Teaching Weizmann Institute of Science

S8.11.3 Addressing Challenges of Construct Validity through the Design of a Scalable Cognitively-Based Science Performance Assessment Task
Audrey S Whitaker, Columbia University
Ann Rivet, Columbia University

S8.11.4 Student Involvement in Assessment -- A Vehicle for Disciplinary Learning
Janet E. Coffey, University of Maryland, College Park
Sandra Honda

Strand 11: Cultural, Social, and Gender Issues
S8.12 SC-Paper Set: Sense of Place and Social Justice in Science Education
4:00pm – 5:30pm, Conference Room 411
Presider:
Robert M. Danielowich, Adelphi University

S8.12.1 Science Education, Radical Social Justice, and Scientific Heteroglossia: An Ethnographic Examination of the Street Medic Movement
Matthew Weinstein, University of Washington-Tacoma

S8.12.2 How Sense of Place Matters: Lessons Learned from the Implementation of an Interdisciplinary Place-Based Curriculum
Tara B. O’Neill, University of Hawaii - Manoa
Angela Calabrese Barton, Michigan State University
Verneda Johnson, Issac Newton Middle School for Math and Science

S8.12.3 “Our Elders are our Scientists”: Western Scientific and Aboriginal Use of Language in oral Presentations
Alberto J. Rodriguez, San Diego State University

Strand 11: Cultural, Social, and Gender Issues
S8.13 Related Paper Set: Place-based Science across Countries and Cultures: In Search of a Model of Universal Design for Learning in Science
4:00pm – 5:30pm, Conference Room 409
Discussant:
Masakata Ogawa, Tokyo University of Science

S8.13.1 Design Elements and Learning Outcomes of Two Place-Based Education Programs Situated in the Southwest United States
Steven Semken, ASU
Deborah Williams, ASU
Janet Ross, Four Corners School of Outdoor Education, Monticello, UT
S8.13.2 Raising Navajo Students’ Engagement and Achievement with PQRST Lesson Planning and Ss of Lesson Delivery
Nancy Kastning, Shonto Preparatory School, AZ

S8.13.3 Exploring Culturally Responsive Curriculum for a High-School Science Class in Hawai’i
Lorinda Forster, Kamehameha School

S8.13.4 Place-based Science Learning as Universal Design: Increasing Access to Science Learning through Study of Shared Places
Pauline Chinn, University of Hawaii, Chiung-Fen Yen, Providence University, Taiwan
Li-Hua Ho, Providence University, Taichung, Taiwan
Huei Lee, National Dong Hwa University, Hualien, Taiwan
Roijana Suratbutra, University of Hawaii
Pornthip Oatthivech, University of Hawaii
Margarita Cholymay, University of Hawaii

Strand 12: Educational Technology
S8.14 SC-Paper Set: Simulations, Design, & Gaming to Support Science Learning and Assessment
4:00pm – 5:30pm, Conference Room 412
Presider:
Timothy D. Zimmerman, Rutgers

S8.14.1 Programming a Simulation to Support 8th Grade Students’ Model-based Learning about Natural Selection
Lin Xiang, University of California, Davis
Cynthia Passmore, University of California, Davis

S8.14.2 Teaching Animals to Fourth Graders with Lego Engineering-Design
Ismail Marulcu, Boston College
Michael Barnett, Boston College

S8.14.3 Using Simulations to Assess Complex Science Learning in Middle School Classrooms
Barbara C. Buckley, WestEd
Edys Quellmalz, WestEd
Matt Silberglitt, WestEd

S8.14.4 Does The 3D Serious Game Physics Geeks Facilitate Learning In Conceptual Physics Students?
Phillip M. Stewart, Teachers College, Columbia University
Ann Rivet, Teachers College, Columbia University

Strand 13: History, Philosophy, and Sociology of Science
S8.15 SC-Paper Set: Teachers’ Knowledge and Practices Related to Nature of Science
4:00pm – 5:30pm, Conference Room 413
Presider:
Nancy Ruggeri

S8.15.1 The Effect of a Content-Embedded Explicit-Reflective Instructional Approach on Inservice Teachers’ Views and Practices Related to Nature of Science
Nader Wabbeh, A.M.Qattan Foundation
Fouad Abd-El-Khalick, University of Illinois at Urbana-Champaign

S8.15.2 Chinese Science Teacher Educators’ Views about the Values of Teaching Nature of Science
ZhiHong Wan, The University of Hong Kong
Siu Ling Wong, The University of Hong Kong

S8.15.3 Year Three, a Replication: Linking Teachers’ Understandings of Nature of Science and Scientific Inquiry with Instructional Ability
Norman G. Lederman, Illinois Institute of Technology
Judith S. Lederman, Illinois Institute of Technology
Kevin J. White, Illinois Institute of Technology

S8.15.4 Teaching Nature of Science in a Third Grade Classroom: An Assessment of Strategies and Student Knowledge
Valarie L. Akerson, Indiana University
Khemawadee Pongsanon, Indiana University
Vanashri Nargund, Indiana University

Strand 14: Environmental Education
S8.16 Related Paper Set: International Perspectives on Preparing Environmentally Literate Teachers
4:00pm – 5:30pm, Conference Room 414

S8.16.1 An Evaluation of the Implementation of Environmental Education in Two Teacher Training Colleges
Jelle Boeve-de Pauw, University of Antwerp
Peter Van Petegem, University of Antwerp

S8.16.2 Preservation and Utilization: An International Study of Pre- And In-Service Teachers’ Environmental Attitudes and Values
Franz Bogner, University of Bayreuth
Britta Oerke, University of Zurich
Michael Wiseman, University of Bayreuth
S8.16.3 Student Teachers’ Conceptions of Environment and Its Relevance to their Area of Teaching: Are these Influenced by Studies? Implications for Teacher Training Programs
Daphne Goldman, Beit Berl Academic College
Bela Yavetz, Kibbutzim College of Education
Sara Pe’er, Oranim College of Education

S8.16.4 Preservice Teachers’ Mental Models of the Environment and Implications for Teaching about the Environment
Blanche Desjean-Perrotta, University of Texas at San Antonio
Christine Moseley, University of Texas at San Antonio

S8.16.5 Ecological Understandings of Teachers in the US: What is Needed to Better Prepare Our Next Generation of Teachers?
Bruce Johnson, University of Arizona
Constantinos Manoli, University of Arizona
Dennis Rosemartin, University of Arizona
Deborah Barca, University of Arizona

Strand 15: Policy
S8.17 SC-Paper Set: Policy Studies Informed by Analyses of Large Data Bases: From International Studies to State Level Studies
4:00pm – 5:30pm, Conference Room 415
Presider:
Roxanne Hughes, FSU

S8.17.1 Scientific Literacy, PISA, and Socioscientific Discourse: Assessment for Progressive Aims of Science Education
Troy D. Sadler, University of Florida
Dana L. Zeidler, University of South Florida

S8.17.2 A National Survey of Middle and High School Science Teachers’ Responses to Standardized Testing: Is Science Being Devalued in Schools?
Mehmet Aydeniz, The University of Tennessee, Knoxville
Sherry A. Southerland, Florida State University

S8.17.3 Comparison of the Implemented Physics Curriculum and Achievement on of Eighth Grade Students in the United States: A Secondary Analysis of TIMSS 2007
John Murdock

S8.17.4 Predicting Science Achievement and Science Teacher Retention in Texas High Schools with School- and Teacher-Level Variables
Carol L. Stuessy, Texas A&M University
Stephanie L. Knight, Pennsylvania State University
Dane Bozeman, Texas A&M University
Toni A. Ivey, Oklahoma State University
Tori Hollas, Texas A&M University
Dawoon Yoo, Texas A&M University
Caroline Vasquez, Texas A&M University
Sara Spikes, Texas A&M University
Ra’sheedah Richardson, Texas A&M University

Evening/Social Events

IJSME Editorial Board Meeting
5:45pm – 6:45pm, Conference Room 501
By Invitation Only

Membership and Elections Committee Sponsored Session
New Researcher 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, Salon C
Discussants:
Laura Henriques, California State University, Long Beach
Julie A. Luft, Arizona State University, Tempe
Reinders Duit, IPN Kiel, Germany
Micheal Beeth, University of Wisconsin - Oshkosh
Eileen R.C. Parsons, University of North Carolina - Chapel Hill
Sibel Erduran, Bristol University
Okhee Lee, University of Miami
April Luehmann

Equity Dinner
7:00pm – 9:00pm, Off Site

Routledge/Taylor & Francis Reception
Invitation only.
7:30pm – 10:00pm, Independence Ballroom
Strand Meetings
7:00am – 8:15am

Strand 1: Science Learning, Understanding and Conceptual Change
Meeting—7:00am – 8:15am, Conference Room 401

Strand 2: Science Learning: Contexts, Characteristics and Interactions
Meeting—7:00am – 8:15am, Conference Room 402

Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies
Meeting—7:00am – 8:15am, Conference Room 403

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies
Meeting—7:00am – 8:15am, Conference Room 404

Strand 5: College Science Teaching and Learning (Grades 13-20)
Meeting—7:00am – 8:15am, Conference Room 405

Strand 6: Science Learning in Informal Contexts
Meeting—7:00am – 8:15am, Conference Room 406

Strand 7: Pre-service Science Teacher Education
Meeting—7:00am – 8:15am, Conference Room 407

Strand 8: In-service Science Teacher Education
Meeting—7:00am – 8:15am, Conference Room 408

Strand 9: Reflective Practice
Meeting—7:00am – 8:15am, Conference Room 409

Strand 10: Curriculum, Evaluation, and Assessment
Meeting—7:00am – 8:15am, Conference Room 410

Strand 11: Cultural, Social, and Gender Issues
Meeting—7:00am – 8:15am, Conference Room 411

Strand 12: Educational Technology
Meeting—7:00am – 8:15am, Conference Room 412

Strand 13: History, Philosophy, and Sociology of Science
Meeting—7:00am – 8:15am, Conference Room 413

Strand 14: Environmental Education
Meeting—7:00am – 8:15am, Conference Room 414

Strand 15: Policy
Meeting—7:00am – 8:15am, Conference Room 415

Concurrent Session #9
8:30am – 10:00am

Presidential Invited Session
S9.1 Symposium: Assessing Youths’ Interest in Science: Understanding Motivation and Identity
8:30am – 10:00am, Conference Room 501
Richard A. Duschl, Penn State University
Jonathan F. Osborne, Stanford University
Leonie Rennie, Curtin University of Technology
Robert H. Tai, University of Virginia
Toni Rogat, Rutgers
Janice Earle, National Science Foundation

Strand 1: Science Learning, Understanding and Conceptual Change
S9.2 Related Paper Set: Utilizing Writing-to-Learn and Multi-Modal Writing Tasks in Science Classrooms
8:30am – 10:00am, Conference Room 401

S9.2.1 Exploring the Impact of Embedding Multiple Modes of Representing Science Information in Varied Classroom Settings
Mark A. McDermott, Wartburg College
Brian Hand, University of Iowa
Andy R. Cavagnetto, Binghamton University-SUNY

S9.2.2 The Impact of Restricted and Student Choice Embedded Multimodal Representations in a Writing to Learn Approach to the Teaching of Pressure, Bouncy and Heat-Temperature Units
Murat Gunel, Ataturk University, Turkey
Cuneyt Ulu, Marmara University, Turkey

S9.2.3 The Impact of the Science Writing Heuristic Approach on Students’ Use and Embedding of Multi-Modal Representations in Summary Writing Tasks
Jeonghee Nam, Pusan National University, Korea
Hyesook Cho, Pusan National University, Korea
Aeran Choi, Kent State University
Brian Hand, University of Iowa
S9.2.4 The Impact of Writing for Older Aged Peers
Ying-Chih Chen, University of Iowa
Brian Hand, University of Iowa
Leah McDowell, Seneca valley School District, Pittsburgh, PA

Strand 2: Science Learning: Contexts, Characteristics and Interactions
S9.3 SC-Paper Set: Integrating Technology and Science in Learning
8:30am – 10:00am, Conference Room 402
Presider: Lei Liu, University of Pennsylvania

S9.3.1 Building Energy Transformation Conceptions through Design-Based Instruction
Clara S Cahill, University of Michigan
Yael Bamberger, University of Michigan
Harold B. Short, University of Michigan
James A. Hagerty, University of Michigan
Joseph S Krajcik, University of Michigan

S9.3.2 Enhancing Students’ Classroom Interaction through the use of Personal Digital Assistants (PDAs)
Edgar D. Corpuz, The University of Texas-Pan American
Ma Aileen A. Corpuz, University of Texas-Pan American
Mark Cunningham, University of Texas-Pan American
Rolando Rosalez, University of Texas-Pan American
Liang Zeng, University of Texas-Pan American

S9.3.3 The Youth Engagement with Science and Technology Survey: Informing Practice and Measuring Outcomes
Glenda M. McCarty, University of Missouri, St. Louis
Jennifer M. Hope, University of Missouri, St. Louis
Joseph L. Polman, University of Missouri, St. Louis

S9.3.4 Integrating Science, Literacy, Technology and Universal Design for Learning to Enhance Middle School Students’ Inquiry-Based Science Learning
LeeAnn M. Sutherland, University of Michigan
Namsoo Shin, University of Michigan
Kasey L. McCall, University of Michigan

S9.4 SC-Paper Set: Exploring Sociocultural Factors Influencing Science Learning
8:30am – 10:00am, Salon D
Presider: Erica N. Blatt, University of New Hampshire

S9.4.1 An Ethnographic Study of Sociocultural Factors Affecting Learning in a High School Environmental Science Course
Erica N. Blatt, University of New Hampshire

S9.4.2 Transforming the Culture of Undergraduate Organic Chemistry through Performance Enhanced Interactive Learning
Karen E. Phillips, Hunter College of the City University of New York

S9.4.3 Exploring the Associations between Social Motivational Factors and Science Achievement among 9th Graders
Fang-Ying Yang, National Taiwan Normal University
Ju-Shi Tseng, National Taiwan Normal University
Shu-Ching Fu, National Taiwan Normal University

S9.4.4 Connecting a Student-Directed Participant Structure to the Acquisition of Collaborative Skills
Dennis W. Smitherry, Elmhurst College
Joan A. Gallagher-Bolos, Glenbrook North High School

Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies
S9.5 SC-Paper Set: Writing in Science
8:30am – 10:00am, Conference Room 403
Presider: David Cline, Saginaw Valley State University

S9.5.1 Elementary Teachers’ Beliefs about How Scientists Use Writing
Nicole J. Glen, Bridgewater State College

S9.5.2 Exploring Primary Teachers’ Conceptions and Implementation of Science Notebook Writing
Vicki McQuitty, Davis College
Sharon Dotger, Syracuse University
Uzma Khan, Syracuse University

S9.5.3. Reasoning about Invisible Forces: The Use of Graphics and Written Text to Reveal Elementary Student Sense Making
John C. Bedward, North Carolina State University
James Minogue, North Carolina State University
Eric N. Wiebe, North Carolina State University
Lauren P. Madden, North Carolina State University
Michael Carter, North Carolina State University
Strand 4: Science Teaching—Middle and High School (Grades 5-12): Characteristics and Strategies
S9.6 Administrative Symposium: Collaborative Study: Improved Pedagogy
8:30am – 10:00am, Conference Room 404

Presenters:
Helen Meyer, University of Cincinnati
Krista Woods, University of Cincinnati
Danielle Dani, Ohio University
Amy Jameson, Dater High School Cincinnati Public Schools
Maureen Andreas, School for Creative and Performing Arts Cincinnati Public Schools
Megan Urbaitis, Norwood High School
Andrea Burrows, University of Cincinnati
Anna Hutchinson, Aiken High School Cincinnati Public Schools
Kathie Maynard, University of Cincinnati
Michelle Marlow, University of Cincinnati

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

S9.7 SC-Paper Set: Preparation of Pre-Service Elementary Science Teachers
8:30am – 10:00am, Conference Room 405

Presider:
Supaporn Porntrai, Ubon Ratchathani University, Thailand

S9.7.1 Preservice Elementary Teachers: Disciplinary Engagement, Knowledge Growth, and Motivation
Anita Roychoudhury, Purdue University
Diana C. Rice, Florida State University

S9.7.2 Embedding Scientific Arguments in a Pre-Service Elementary Science Methods Course to Develop NOS
Sharon P. Schleigh, East Carolina University
Katie Nock, East Carolina University
Tammy Lee, East Carolina University

S9.7.3 Reform in Entry-Level Undergraduate Science Coursework: Impacts on Pre- and In-Service K-6 Teachers in a National Sample
Dennis W. Sunal, University of Alabama
Cynthia S Sunal, University of Alabama
Cheryl L. Mason, San Diego State University
Dean Zollman, Kansas State University
Corrine Lardy, San Diego State University
Erika Steele, University of Alabama
Mjogan Matloob-Haghanikar, Kansas State University
Donna Turner, University of Alabama
Sytil Murphy, Kansas State University

Strand 6: Science Learning in Informal Contexts

S9.9 Symposium: OST Science: It’s Not What You Think! Variations across Learning Goals and Outcomes and the Implications for Research Methods and Tools
8:30am – 10:00am, Conference Room 406

Presiders:
Bronwyn Bevan, Exploratorium
Susan A Yoon, University of Pennsylvania
Irene Lee, Santa Fe Institute
Kim Sadler, Middle Tennessee State University
Susan Brown, New Mexico State University

Strand 7: Pre-service Science Teacher Education

S9.10 Symposium: Improving Science Teacher Preparation by Studying How Knowledge & Identity Affect Teaching Practices
8:30am – 10:00am, Conference Room 407

Discussants:
Gail Richmond, Michigan State University
Joyce M. Parker, Michigan State University
Hosun Kang, Michigan State University
Takumi Sato, Michigan State University
Amelia W. Gorwal, Michigan State University
Amy Lark, Michigan State University
HsingChi von Bergmann, University of Calgary
Charles W. Anderson, Michigan State University

Strand 8: In-service Science Teacher Education

S9.11 SC-Paper Set: PCK, PD and Evidence
8:30am – 10:00am, Conference Room 408

Presiders:
Yue Li, Miami University
S9.11.1 Improving Students’ Science Achievement through Long-Term Teacher Professional Development
Yue Li, Miami University
Kathryn Scantlebury, University of Delaware
Jane B. Kahle, Miami University
Constance Blasie, University of Pennsylvania
Sarah B. Woodruff, Miami University

S9.11.2 Exploring Process of Constructing Pedagogical Content Knowledge (PCK) in Science Teaching
Kongju Mun, Ewha Womans University
Sung-Won Kim, Ewha Womans University

S9.11.3 How to Change Science Teachers’ Practice? An Evidence-based Approach in a Continuous Professional Development (CPD) Program
Liora Bialer, Kibbutzim College of Education, Israel
Bat-Sheva Eylon, Technion - Institute of Technology, Israel
Zahava Scherz, Weizmann Institute of Science, Rehovot, Israel

S9.11.4 Enhancing Elementary Teachers’ Content and Pedagogical Knowledge through Sustained Professional Development
Sarah B. Woodruff, Miami University
Terry L. McCollum, Miami University
Yue Li, Miami University
Nazan U. Bautista, Miami University

Strand 8: In-service Science Teacher Education
S9.12 SC-Paper Set: Professional Development for the Science Teacher
8:30am – 10:00am, Salon C
Presider:
Yael Furman Shaharabani, Technion - Israel Institute of Technology; The Weizmann Institute of Science

S9.12.1 Enhancing Continuing Professional Development: Contribution from Pre-Service Teachers
Karen M. Kerr, St. Mary’s University College Belfast
Colette Murphy, Queens University Belfast
Jim Beggs, St. Mary’s University College Belfast

S9.12.2 Professional Development as a Change in Teachers’ Conceptions of Teaching and Learning: A Retrospective
Yael Furman Shaharabani, Technion - Israel Institute of Technology; The Weizmann Institute of Science
Tali Tal, Technion - Israel Institute of Technology

S9.12.3 Exploring the Teacher Professional Growth Continuum - Implications for Professional Development
Mary E. Hobbs, The University of Texas at Austin
Amy L. Moreland, The University of Texas at Austin

S9.12.4 A Longitudinal Evaluation Study of a University Model for Science Teacher Professional Development through Clustered Randomized Design
Dana V. Diaconu, Rice University
Wallace Dominey, Rice University
Milijana Suskavcevic, Rice University

Strand 10: Curriculum, Evaluation, and Assessment
S9.13 Related Paper Set: Assessing Pedagogical Content Knowledge
8:30am – 10:00am, Conference Room 410

S9.13.1 Assessing Components of Pedagogical Content Knowledge through Observational Methods
William R. Veal, College of Charleston

S9.13.2 Understanding and Assessing Primary Science Student Teachers’ Pedagogical Content Knowledge
Pernilla Nilsson, Halmstad University
John Loughran, Monash University

S9.13.3 Pedagogical Content Knowledge of Inquiry: An Instrument to Assess It and Its Application to High School In-Service Science Teachers
Andoni Garritz, Universidad Nacional Autónoma de México
Diana V. Labastida-Pina, Universidad Nacional Autónoma de México
Silvia Espinosa-Bueno, Universidad Nacional Autónoma de México
Kira Padilla, Universidad Nacional Autónoma de México

S9.13.4 Assessment and Evaluation of Pedagogical Content Knowledge
Jan H. van Driel, ICCLON-Leiden University
James G. Makiister, Hobart and William Smith Colleges

Strand 12: Educational Technology
8:30am – 10:00am, Conference Room 412
Presenter:
Diane Jass Ketelhut, Temple University
Douglas B. Clark, Vanderbilt University
Brian C. Nelson, Arizona State University
Catherine C. Schifter, Temple University
Cynthia M. D’Angelo, Arizona State University
Tara Kane, Temple University
Muhsin Menekse, Arizona State University
Angela Shelton, Temple University
Kent Slack, Arizona State University
Mark Snyder, Temple University
Strand 13: History, Philosophy, and Sociology of Science
S9.15 SC-Paper Set: Curricula and Nature of Science
8:30am – 10:00am, Conference Room 413
**Presider:**
Fouad Abd-El-Khalick, University of Illinois

S9.15.1 Analysis of Nature of Science Coverage in Egyptian and Lebanese Middle School Science Textbooks
Zoubeida R. Dagher, University of Delaware
Saouma BouJaoude, American University of Beirut
Sahar Alameh, The American University of Beirut

S9.15.2 How Secondary Science Textbooks Present Scientific Methodology
Ian C. Binns, Louisiana State University
Randy L. Bell, University of Virginia
Wednesday, March 24, 2010

S9.15.3 Degrees of Concordance between Scientific Representations of Evolutionary Theory and Contemporaneous High School Biology Textbooks through the 20th Century
Patrick J. Halbig, University of Illinois at Urbana-Champaign
Fouad Abd-El-Khalick, University of Illinois at Urbana-Champaign

S9.15.4 Let’s Do It Together! A Collaborative Project of Researchers and Practitioners on Implementing History and Philosophy in Science Teaching
Dietmar Hoettecke, University of Kaiserslautern / Germany
Falk Riess, University of Oldenburg / Germany
Andreas Henke, University of Bremen / Germany

Strand 14: Environmental Education
S9.16 Symposium: How to Change University Faculty Members’ Attitudes and Behavior in the Context of Education for Sustainable Development
8:30am – 10:00am, Conference Room 414
**Presenters:**
Ahmad M. Qablan, The Hashemite University
Suleiman Al-Qaderi, Al al-Bayt University
Jamal H. Abu Al Ruz, The Hashemite University
Samer Khasawneh, The Hashemite University

Strand 15: Policy
S9.17 Symposium: Connecting Research to Policy and Practice: NARST and Its Affiliates
8:30am – 10:00am, Conference Room 415
**Discussant:**
Julie A. Luft, Arizona State University
**Presenters:**
Francis Erberle, National Science Teachers Association
Justin Dillon, King’s College London
Jon Pedersen, University of Nebraska
Jodi Peterson, National Science Teachers Association
Jo Ellen Roseman, American Association for the Advancement of Science

**Break**
10:00am – 10:30am, Salons E and F

**Concurrent Session #10**
10:30am – 12:00pm

International Committee Sponsored Session
S10.1 Administrative Symposium: Challenges and Opportunities between Research and Practice --- From International Perspectives
10:30am – 12:00pm, Conference Room 501
**Discussant:**
Justin Dillon, King’s College London
**Presenters:**
Mei-Hung Chiu, National Taiwan Normal University
Ling L. Liang, La Salle University
Xian Chen, Nanjing Normal University, China
Uri Zoller, Haifa University - Israel
Claudia von Aufschnaiter
Miancheng Guo, Illinois Institute of Technology
Vanashri Nargund, Indiana University
Meredith A. Park Rogers, Indiana University
Strand 1: Science Learning, Understanding and Conceptual Change

S10.2 Related Paper Set: Evaluating Proposed Learning Progressions: What Can We Learn From Cross-Sectional Data and Longitudinal Studies?
10:30am – 12:00pm, Conference Room 401
Discussant:
Marianne Wiser, Clark University

S10.2.1 Using a Comparative, Longitudinal Study with Upper Elementary School Students to Test Some Assumptions of a Learning Progression for Matter
Carol L. Smith, University of Massachusetts at Boston
Marianne Wiser, Clark University
David Carraher, TERC

S10.2.2 A Longitudinal Validation Study of a Learning Progression in Genetics
Nicole Shea, Rutgers University
Ravit Duncan, Rutgers University

S10.2.3 Progress toward the Development of an Empirically Tested Learning Progressions For the Nature of Matter
Shawn Y. Stevens, University of Michigan
Namsoo Shin, University of Michigan
Joseph S. Krajcik, University of Michigan

S10.2.4 Using Rasch Modelling on a Large Cross-Sectional Data-Set to Test for a Learning Progression in Chemistry Suggested by a Previous, Small-Scale, Three Year Longitudinal Study
Philip Johnson, Durham University

Strand 2: Science Learning: Contexts, Characteristics and Interactions

S10.3 Related Paper Set: Classroom Interactions Supporting the Development of Modeling Practices In Elementary and Middle School Classrooms
10:30am – 12:00pm, Salon D
Discussants:
Brian J. Reiser, Northwestern University
Elizabeth A. Davis, University of Michigan

S10.3.1 Examining 4th Grade Students’ Changing Scientific Modeling Practices: Influence of Time and Content
M. E. Gonzalez, University of Illinois at Urbana-Champaign
Barbara Hug, University of Illinois at Urbana-Champaign

S10.3.2 Supporting 5th Grade Elementary Students’ Development of Modeling Practice over Time with Multiple Modeling Experiences in Different Subject Matter Contexts
Lisa Kenyon, Wright State University
Michelle Cotterman, Wright State University

S10.3.3 The Affordances and Challenges of Scientific Modeling in a 5th Grade Unit on Evaporation and Condensation
Hayat Hokayem, Michigan State University
Jing Chen, Michigan State University
Hamin Baek, Michigan State University
Li Zhan, Michigan State University
Christina Schwarz, Michigan State University

S10.3.4 Middle School Students and Teachers Making Sense of Modeling Practices in Their Classroom
Andres Acher, Northwestern University
Brian J. Reiser, Northwestern University
Elizabeth A. Davis, University of Michigan

Strand 2: Science Learning: Contexts, Characteristics and Interactions

S10.4 SC-Paper Set: Contexts and Factors Influencing Students’ Conceptual Development and Achievement
10:30am – 12:00pm, Conference Room 402
Presider:
Anat Yarden, Weizmann Institute of Science

S10.4.1 Quality of Instruction in Biology
Stefanie Wuesten, University Duisburg-Essen
Stephan Schmelzing, University Duisburg-Essen
Martin Linsner, University Duisburg-Essen
Angela Sandmann, University Duisburg-Essen
Birgit Neuhaus, University München

S10.4.2 Conceptual Metaphors and hidden Analogies in Physics Language: Textbook Analysis and its Relevance for Physics Teacher Education
Lutz Kasper, University of Education Freiburg (Germany)

S10.4.3 High School Science Teachers Supporting Literacy: A Role for Explicit Comprehension Instruction?
Phillip Herman, University of Pittsburgh
Kristen Perkins, Northwestern University
Martha Hansen, Evanston Township High School
Louis M. Gomez, University of Pittsburgh
Kimberley Gomez, University of Pittsburgh
S10.4.4 Depth and Breadth: Bridging the Gap between Scientific Inquiry and High-Stakes Testing with Diverse Junior High School Students
Emily J.S Kang, Adelphi University

Strand 4: Science Teaching—Middle and High School (Grades 5-12): Characteristics and Strategies
S10.5 Symposium: The Invisible College for Inquiry Science Study (ICISS): Integrating Teaching and Research in a Professional Community
10:30am – 12:00pm, Conference Room 404
Presenters:
Scott McDonald, The Pennsylvania State University
Brett Criswell, Keeneasaw State University
Scott Delone, The Pennsylvania State University
Cecilia Tang, The Pennsylvania State University

S10.6 SC-Paper Set: Discourse and Argumentation in Undergraduate Biology
10:30am – 12:00pm, Conference Room 405
Presider:
Jennifer Cromley, Temple University

S10.6.1 The Nature of Undergraduate Students’ Questions during Inquiry and the Roles of the Teacher in Fostering Question Asking
Iris Alkaher, Virginia Tech
Erin Dolan, Virginia Tech

S10.6.2 “Not Simply What’s the Science, but How Does It Affect People, and Why Is That Important?” Effects of an Interdisciplinary Human Biology Program Focused on Socioscientific Reasoning
Jennifer L. Eastwood, Indiana University
Kristin L. Cook, Indiana University
Robert D. Sherwood, Indiana University
Whitney M. Schlegel,

S10.6.3 The Nature of Discourse Throughout 5E Lessons in a Large Enrollment College Biology Course
Aaron J. Sickel, University of Missouri
Binaben H. Vanmali, University of Missouri
Stephen B. Witzig, University of Missouri
Sandra K. Abell, University of Missouri

S10.6.4 Experience with Primary Literature by Undergraduate Life Science Students: A Lesson in Scientific Argumentation
Miriam A. Ossevoort, University of Groningen, the Netherlands
Edwin B. van Lacum, University of Groningen, the Netherlands
Martin J. Goedhart, University of Groningen, the Netherlands

Strand 6: Science Learning in Informal Contexts
S10.7 Symposium: Teacher's Experience in Informal STEM Settings: What Lessons Can We Learn?
10:30am – 12:00pm, Conference Room 406
Presenters:
Vera S Michalchik, SRI International
Bob Coulter, Litzinger Road Ecology Center
Tina Cartwright, West Virginia State University
Kelly Pirog, University of Massachusetts Amherst
Allan Feldman, University of South Florida

S10.8 Symposium: Exploring the Utility of Discipline-Specific Pedagogy Courses in Science Teacher Recruitment and Preparation
10:30am – 12:00pm, Conference Room 407
Presenters:
Erin M Furtak, University of Colorado at Boulder
Noah Finkelstein, University of Colorado at Boulder
Jill Marshall, University of Texas at Austin
Michael Klymkowsky, University of Colorado at Boulder
David E. Kanter, Temple University
Angelo Collins, Knowles Science Teaching Foundation

S10.9 SC-Paper Set: Pre-Service Teachers’ Development of More Sophisticated Knowledge and Practices
10:30am – 12:00pm, Conference Room 409
Presider:
Charles W. Anderson, Michigan State University

S10.9.1 Critical and Contextual Discourses: Explaining the Development of Ambitious Practices Across “Learning-to-Teach” Contexts
Jessica Thompson, University of Washington
Mark Windschitl, University of Washington
Melissa Braaten, University of Washington

S10.9.2 Secondary Science Teacher Candidates’ Learning of Formative Assessment: How do they respond to students and why?
Hosun Kang, Michigan State University
Amelia W. Gorwals, Michigan State University
Charles W. Anderson, Michigan State University
S10.9.3 The Development of Pedagogical Content Knowledge during Teacher Education
Andreas Borowski, University Duisburg-Essen
Hans E. Fischer, University Duisburg

S10.9.4 Examining Shifts in Preservice Teachers’ Practice-Oriented Goals as Indicators of Learning to Teach Toward Science Reform Initiatives
Robert M. Danielowich, Adelphi University

Strand 8: In-service Science Teacher Education
S10.10 SC-Paper Set: Mentoring and Science Teacher Retention
10:30am – 12:00pm, Salon C

Presider:
Yushaneen Wilson, Penn Science Teacher Institute

S10.10.1 A Case Study of Urban Secondary Science Teacher Career Satisfaction and Retention in an Alternative Certification Program
Christina Gonzalez, Lehman College
Angela Kelly, Lehman College

S10.10.2 Educative Mentoring: Reframing the Potential for Mentoring in Science Education
Leslie U. Bradbury, Appalachian State University

S10.10.3 Teacher Thinking Associated with Science-Specific Mentor Preparation
Michael Dias, Kennesaw State University
Thomas R. Koballa, University of Georgia
Julie M. Kittleson, University of Georgia
Leslie U. Bradbury, Appalachian State University

S10.10.4 Early Leavers and Vertical Advancers: Sociocultural Factors Influencing Teacher Attrition from a Graduate Program for Middle and High School Science Teachers
Yushaneen Wilson, University of Pennsylvania
Sonya N. Martin, Drexel University
Rachel Ruggirello, Washington University, St. Louis, MO

Strand 8: In-service Science Teacher Education
S10.11 SC-Paper Set: Efficacy and Reform
10:30am – 12:00pm, Conference Room 408

Presider:
Molly Holden, Texas Christian University

S10.11.1 Science Educators Today: Results from the National Science Teachers Association’s First Ever State of Science Education Survey
Sissy S. Wong, Arizona State University
Irasema B. Ortega, Arizona State University
Julie A. Luft, Arizona State University
Francis Eberle, National Science Teachers Association

S10.11.2 Content, Self-Efficacy, and the Nature of Science Gains from Immersive Science Courses for K-8 Teachers
Margaret D. Nolan, School of Education, Boston University
Peter Garik, Boston University
Charles Winrich, Boston University
Donald DeRosa, Boston University
Andrew Duffy, Boston University
Russell Faux, Davis Square Research Associates
Bennett Goldberg, Boston University
Manher Jariwala, Boston University
Bristol Konoian, English High School, Boston Public Schools
Glenn Stevens, Boston University

S10.11.3 Collaborative Professional Development and Curriculum Enactment: Teacher Reflection to Inform Classroom Discussions in Project-Based Science
Nonye M. Alozie, University of Michigan

S10.11.4 Assessing Efficacy through an Outdoor Professional Development Experience for Inservice Science Teachers
Molly Holden, Texas Christian University
Judith Groulx, Texas Christian University
Mark A. Bloom, Texas Christian University
Molly H. Weinburgh, Texas Christian University

Strand 10: Curriculum, Evaluation, and Assessment
S10.12 Related Paper Set: Toward a Framework for Studying Research-Based Science Curricula
10:30am – 12:00pm, Conference Room 410

S10.12.1 A Framework for Studying Research-Based Science Curricula: Theoretical Foundations
Janet Carlson, BSCS
Joseph Taylor, BSCS

S10.12.2 Curriculum Field Test Studies - Example One: Focus on Implementation Fidelity
Joseph Taylor, BSCS
Janet Carlson, BSCS

S10.12.3 Curriculum Field Test Studies - Example Two: Focus on Achievement Gaps
Susan Kowalski, BSCS
Joseph Taylor, BSCS
S10.12.4 Curriculum Efficacy Studies - Example One: Comparisons to Commonplace Curriculum and Teaching
Christopher Wilson, BSCS
Joseph Taylor, BSCS
Susan Kowalski, BSCS
Janet Carlson, BSCS

Strand 11: Cultural, Social, and Gender Issues
10:30am – 12:00pm, Conference Room 411

S10.13.1 Creating and Maintaining Emotional Climates to Afford Success in Science Education
Kenneth G. Tobin, City University of New York, Graduate Center
Llena Reynaldo, City University of New York
Devin Sepulveda, City University of New York
Selenia Abad, City University of New York

S10.13.2 Laughter, Perseverance, and Kinship among Minority Students in a Physics Classroom
Konstantinos Alexakos, School of Education, Brooklyn College, CUNY
Victor H. Rodriguez, Brooklyn College, CUNY
Jayson J. Jones, Brooklyn College, CUNY

S10.13.3 The Role of Laughter in Science Teacher Education Courses
Christina A. Siry, University of Luxembourg

S10.13.4 Examining the Role of Laughter as Structures for Developing Reflexivities towards Teaching and Learning
Preeti Gupta, New York Hall of Science
Jennifer H. Correa, New York Hall of Science

Strand 12: Educational Technology
S10.14 Symposium: Research on Teaching and Learning Science with Geospatial Technologies
10:30am – 12:00pm, Conference Room 412

Presenters:
James G. MaKinster, Hobart and William Smith Colleges
Cathlyn D. Stylinski, University of Maryland
Carla McAuliffe, TERC
Michael Barnett, Boston College
Nancy M. Trautmann, Cornell Lab of Ornithology
Alec M. Bodzin, Lehigh University
Louise Yarnall, SRI International
Shey Conover, Island Institute

Strand 13: History, Philosophy, and Sociology of Science
S10.15 Symposium: NOS between Subject-Specific and Subject-Comprehensive Science Education Approaches
10:30am – 12:00pm, Conference Room 413

Discusant:
Fouad Abd-El-Khalick, University of Illinois at Urbana-Champaign

Presenters:
Nicola Mittelsten Scheid, Queens University, Canada
Renee Schwartz, Western Michigan University
Kerstin Kremer, Institut für Biologiedidaktik Karl Juergen Mayer, Justus-Liebig-Universität Gießen
Pinar Cetin, Middle East Technical University
Sibel Erduran, University of Bristol
Ebru Kaya, Middle East Technical University

Strand 14: Environmental Education
S10.16 SC-Paper Set: Fostering Collective Responsibility in Environmental Education
10:30am – 12:00pm, Conference Room 414

Presider:
Scott Townsend, Eastern Kentucky University

S10.16.1 A Sociocultural Model for Motivation of Indigenous Students to Learn Science
Eleanor D. Abrams, University of New Hampshire
Michael J. Middleton, Morrill Hall University of New Hampshire
Chiung-Fen Yen, Providence University Taichung, Taiwan
Judy Tang, Morrill Hall University of New Hampshire

S10.16.2 Environmentalism in the Science Classroom: Complex Issues, Complex Understandings?
Michael L. Tan, University of Toronto
Erminia G. Pedretti, University of Toronto

S10.16.3 How Different Populations of College Students Write and Learn About Ecology
Meena M. Balgopal, Colorado State University
Alison M. Wallace, Minnesota State University Moorhead
Steve Dahlberg, White Earth Tribal Community College

S10.16.4 Incorporating the Ocean into Diverse Contexts: A Collective Case Study
Meghan E. Marrero, U.S Satellite Laboratory, Inc.
Strand 15: Policy
S10.17 Symposium: The Role of Public Policy in K-12 Science Education
10:30am – 12:00pm, Conference Room 415

Presenters:
George E. DeBoer, AAAS Project 2061
Janice Earle, National Science Foundation
Dennis W. Cheek, Ewing Marion Kauffman Foundaiton
Jodi Peterson, National Science Teachers Association
Sarah B. Woodruff, Ohio’s Evaluation & Assessment Center for Mathematics and Science Education
Noah R. Feinstein, University of Wisconsin-Madison
Linda De Lucchi, University of California at Berkeley
Sharon J. Lynch, National Science Foundation
Rodger W. Bybee, BSCS
Jonathan F. Osborne, Stanford University

Lunch on Your Own
12:00pm – 1:00pm

Concurrent Session #11
1:15pm – 2:45pm

International Committee Sponsored Session
S11.1 Administrative Symposium: ESERA at NARST: Research into Practice: Practice Informing Research: European Dimensions
1:15pm – 2:45pm, Salon D

Discussant:
Kenneth G. Tobin, City University of New York

Presenters:
Justin Dillon, King’s College London
Avi Hofstein, The Weizmann Institute of Science, Israel
Rachel Mamlok-Naaman, The Weizmann Institute of Science, Israel
Mira Kipnis, University of York, UK
Anna Jobé, Malmö University, Sweden
Robin Millar, University of York, UK
Clas Olander, University of Gothenburg, Sweden
Ake Ingerman, University of Gothenburg, Sweden

Strand 1: Science Learning, Understanding and Conceptual Change
S11.2 Related Paper Set: Learning Progression for Carbon Cycling in Socio-ecological Systems
1:15pm – 2:45pm, Conference Room 401

Presider:
Charles W. Anderson, Michigan State University

Discussant:
Joseph S Krajcik, University of Michigan

S11.2.1 Promoting Students’ Causal Reasoning about Carbon Cycling Processes
Hui Jin, Michigan State University
Charles W. Anderson, Michigan State University

S11.2.2 Students’ Learning Trajectories of Carbon Cycling in US and China
Li Zhan, Michigan State University
Hui Jin, Michigan State University
Jing Chen, Michigan State University
Charles W. Anderson, Michigan State University

S11.2.3 Assessing K-12 Students’ Learning Progression of Carbon Cycling With Items in Different Formats
Jing Chen, Michigan State University
Charles W. Anderson, Michigan State University
Choi Jinnie, University of California, Berkeley
Yong-sang Lee, University of California, Berkeley
Karen L. Draney, University of California, Berkeley

S11.2.4 Secondary Students’ Arguments about Carbon-transforming Processes Before and After Instruction
Kennedy M. Onyancha, Michigan State University
Charles W. Anderson, Michigan State University

S11.2.5 College Student Understanding of Carbon Transformation and Cycling Processes
Jonathon W. Schramm, Michigan State University
Wilke Brooke, Michigan State University
Hartley Laurel, University of Colorado, Denver
Charles W. Anderson, Michigan State University

Strand 1: Science Learning, Understanding and Conceptual Change
S11.3 Related Paper Set: Narrative and Textual Analysis
1:15pm – 2:45pm, Conference Room 413

Presider:
Lawrence B. Flick, Oregon State University
S11.3.1 Exploring Narrative Scaffolding in the use of Multimedia Simulations for the Teaching and Learning of Chemistry
Catherine E. Milne, NYU
Jan Plass, NYU
Bruce Homer, CUNY Graduate Center
Trace Jordan, NYU
Ruth Schwartz, NYU
Yan Wang, American Institutes for Research
Yoo Chang, NYU
Florrie Ng, CUNY Graduate Center & NYU
Elizabeth Hayward, NYU

S11.3.2 Perceived vS Actual Knowledge of Students in Chemical Education
Shirly Avargil, Technion- Israel Institute of Technology
Orit Herscovitz, Technion- Technion - Israel Institute of Technology and Ort Braude Academic College of Engineering, Israel
Yehudit Judy Dori, Technion- Israel Institute of Technology and Massachusetts Institute of Technology

S11.3.3 A Study of Students¿ Reading Strategies in Different Science Argumentative Text
Sung-Tao Lee, Naval Academy, Taiwan
Fu-Pei Hsieh, Kuang-Hua Primary School, Taiwan
Yen-Wen Lin, An-Chao Primary School, Kaohsiung, Taiwan
Pei-Jun Chen, Chung-Sang Primary School, Kaohsiung, Taiwan

S11.3.4 Sharing Knowledge Using Text-Based Structured Dialogue Environment In Understanding And Promoting The Conceptual Change Of Science Teachers’ Thinking Of The Nature Of Science
Nasser Mansour, University of Exeter
Rupert Wegerif, University of Exeter
Nigel Skinner, University of Exeter
Keith Postlethwaite, University of Exeter
Azza A. Hashem, University of Exeter
Mriga Williams, University of Exeter
Lindsay Hetherington, University of Exeter

S11.4.3 Playing With Narrative: Developing Expertise in Story-Telling as Connected to Biology and Personal Interests
Heather T. Zimmerman, Pennsylvania State University
Suzanne Reeve, University of Washington

S11.4.4 “God Mode Is His Video Game Name”: Expertise Development in Technology Domains
Leah A. Bricker, Loyola University Chicago
Philip Bell, University of Washington

S11.4.5 Developing Expertise In “Doing School”: Tracing One Family’s Pathway towards Academic Success
Suzanne Reeve, University of Washington
Heather T. Zimmerman, Pennsylvania State University

Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies
S11.5 Symposium: Teacher Knowledge(s) and Teacher Change: Reflections on Conceptualizations that Inform Research and Teacher Education Practices
1:15pm – 2:45pm, Conference Room 404
Discusant:
Fouad Abd-El-Khalick, University of Illinois at Urbana-Champaign
Presenters:
Sara Salloum, Long Island University – Brooklyn
Saouma Boujaoude, American University of Beirut, Lebanon
Sherry A. Southerland, Florida State University
Julie Gess-Newsome, Northern Arizona University
Jan H. van Driel, Leiden University, The Netherlands

Strand 5: College Science Teaching and Learning (Grades 13-20)
S11.6 SC-Paper Set: Understanding and Visualization in the Life Sciences
1:15pm – 2:45pm, Conference Room 405
Presider:
Stephen B. Witzig, University of Missouri, Columbia

S11.6.1 Exploring the Link between Mental Rotation and College Student Learning with Phylogenetic Tree
Kristy L. Halverson, University of Southern Mississippi
S11.6.2 Undergraduate Students’ Conceptions of Learning Biology and Their Approaches to Learning Biology
Guo-Li Chiou, National Taiwan University of Science and Technology
Jyh-Chong Liang, National Taiwan University
Chin-Chung Tsai, National Taiwan University of Science and Technology

S11.6.3 Decoding of Visual Narratives used in University Biology
Phyllis Griffard, Weill Cornell Medical College in Qatar

S11.6.4 Pharmacy Students’ Analysis of Medical Advertisements: A Method to Improve Instructional Practice based on Research on Learning
Paula A. Witt-Enderby, Duquesne University
Eva E. Toth, West Virginia University
Jordan Espenshade, Duquesne University

Strand 5: College Science Teaching and Learning
(Grades 13-20)
S11.7 Related Paper Set: Teaching Into Research-Research into Teaching: Examining the Ties That Bind
1:15pm – 2:45pm, Conference Room 414

S11.7.1 Factors That Facilitate Inquiry-Based Teaching
Cindy Stiegelmeyer, University of South Carolina
Michelle Maher, University of South Carolina
David Feldon, University of Virginia
Briana Timmerman, University of South Carolina

S11.7.2 Crossing the Threshold Concept: A Transformative View of Research Skill Development
Briana Timmerman, University of South Carolina
Michelle Maher, University of South Carolina
Denise Strickland, University of South Carolina
David Feldon, University of Virginia

S11.7.3 Exploring the Goal Commitment of Teachers and Researchers in Science, Technology, Engineering, Math, and Education
Melissa Hurst, University of South Carolina

S11.7.4 An Exploratory Study of Factors Influencing the Development of STEM Graduate Students’ Teaching Skills
Joanna Gilmore, University of South Carolina
Melissa Hurst, University of South Carolina

Strand 6: Science Learning in Informal Contexts
S11.8 Symposium: Using Informal Learning Environments to Support Future Science Teachers
1:15pm – 2:45pm, Conference Room 406
Discussant:
Jennifer DeWitt, King’s College London
Presenters:
James Kisiel, California State University, Long Beach
Melissa Mercer-Tachick, Albion College
Janette Griffin, University of Technology, Sydney
Shawn Rowe, Oregon State University
Jennifer DeWitt, King’s College London

Strand 7: Pre-service Science Teacher Education
S11.9 Symposium: From University Students to Teachers of Science: Researching Preservice K-8 Teachers’ Development of Pedagogical Context Knowledge within a Reform-Based Curriculum
1:15pm – 2:45pm, Conference Room 407
Presenters:
Steve Fifield, University of Delaware
John Madsen, University of Delaware
Danielle Ford, University of Delaware
Linda Grusenmeyer, University of Delaware
Ratna Nandakumar, University of Delaware
Eric Pizzini, University of Delaware
Xiaoyu Qian, University of Delaware

S11.10 SC-Paper Set: Impact of Lab Work and Inquiry Experiences in Pre-Service Teacher Education
1:15pm – 2:45pm, Conference Room 409
Presider:
Thomas R. Koballa, University of Georgia

S11.10.1 Level of Inquiry as Motivator in an Inquiry Methods Course
Mizrap Bulunuz, Uludag University
Olga S Jarrett, Georgia State University
Lisa Martin-Hansen, Georgia State University

S11.10.2 The Impact of an Inquiry-Based Science Education Program for Pre-Service Elementary Teachers
Susan A. Everett, University of Michigan-Dearborn
Charlotte A. Otto, University of Michigan-Dearborn
Richard H. Moyer, University of Michigan-Dearborn
Paul W. Zitzewitz, University of Michigan-Dearborn
S11.10.3 Research into Practice - Practice Informing Research: A Case from the Physical Science Laboratory for Elementary Teachers
Milijana Suskavcevic, Rice University
Eric Hagedorn, University of Texas at El Paso

S11.10.4 Understanding the Nature of Pre-Service Science Teachers’ Argumentation during Laboratory Work.
Yasemin Özdem, Gaziosmanpasa University
Hamide Ertepinar, Middle East Technical University
Çakyrodlu Jale, Middle East Technical University

Strand 8: In-service Science Teacher Education
S11.11 SC-Paper Set: Science Education and the Elementary Context
1:15pm – 2:45pm, Conference Room 408
Presider:
Richard F. Gunstone, Monash University

S11.11.1 The Development, Implementation and Evaluation of an Intensive System-Wide Professional Learning Program for Elementary Science Teachers
Deborah J. Corrigan, Monash University
Richard F. Gunstone, Monash University
Rebecca Cooper, Monash University

S11.11.2 Advancing Science and Engineering in Elementary Schools: Fostering Teachers’ Knowledge and Scientific Inquiry
Augusto Z. Macalalag Jr., Stevens Institute of Technology
Karen Guo, Teachers College, Columbia University
Susan Lowes, Teachers College, Columbia University
Mercedes McKay, Stevens Institute of Technology
Elisabeth McGrath, Stevens Institute of Technology

S11.11.3 Developing a Hybrid Online/On Site Community of Practice to Support K-8 Teachers’ Improvement in Inquiry and Nature of Science Conceptions
Jeffery S Townsend, Eastern Kentucky University
Valarie L. Akerson, Indiana University
Ingrid S Weiland, Indiana University

S11.11.4 Conceptions of Sound: A Lesson Model to Promote Accommodation in Elementary Teachers
Barbara A. Austin, Northern Arizona University

S11.12 SC-Paper Set: Technology, Distance Learning and Science Education
1:15pm – 2:45pm, Salon C
Presider:
Margaret R. Blanchard, North Carolina State University

S11.12.1 Virtual Professional Learning Communities: Video-Conferencing as a Tool to Facilitate Teacher Learning
Tom J. McConnell, Ball State University
Joyce M. Parker, Michigan State University
Jan Eberhardt, Michigan State University
Matthew J. Koehler, Michigan State University
Mary A. Lundeberg, Michigan State University

S11.12.2 Investigating the Role of Pedagogical Discontentment in Teachers’ Changes in Practice: An Exploration of 23 Rural Science and Mathematics Teachers Following Technology-Infused Teacher Professional Development
Margaret R. Blanchard, North Carolina State University
Jason W. Osborne, North Carolina State University
Jennifer Sharp, North Carolina State University

S11.12.3 Effecting Change in the Teaching of Temperature and Heat through Distance Learning
Rebecca M. Krall, University of Kentucky
Amber M. Sullivan, University of Kentucky
Ashlie M. Beals, University of Kentucky
Joseph P. Straley, University of Kentucky
Sally A. Shafer, University of Kentucky
Jeffrey L. Osborn, University of Kentucky

S11.12.4 Inquiry Practices and Identities of Beginning Secondary Science Teachers in Online and Offline Contexts
EunJin Bang, Iowa State University
Julie A. Luft, Arizona State University

Strand 10: Curriculum, Evaluation, and Assessment
S11.13 Related Paper Set: Teaching and Learning Engineering
1:15pm – 2:45pm, Conference Room 410
Discussant:
Dale R. Baker, Arizona State University

S11.13.1 A Place for Engineering in Science Education
Dale R. Baker, Arizona State University
Senay Purzer, Purdue University
Mehmet Aydeniz, University of Tennessee

S11.13.2 Survey of the Nature of Engineering: Views of First-year Science and Engineering Students
George M. Bodner, Purdue University
Faik Karatas, Purdue University

S11.13.3 Middle School Students Perceptions of Engineering
Tirupalavanam G. Ganesh, Arizona State University
S11.13.4 Elementary Students’ Learning Progressions and Prior Knowledge on Engineering Design Process
Ming-Chien Hsu, Purdue University
Monica Cardella, Purdue University
Senay Purzer, Purdue University

S11.13.5 Stages of Teachers’ Concerns on Integrating Engineering into Elementary Classrooms
JeongMin Lee, Purdue University
Johannes Strobel, Purdue University

Strand 10: Curriculum, Evaluation, and Assessment
S11.14 SC-Paper Set: Developing and Assessing Higher-Order Thinking and Nature of Science
1:15pm – 2:45pm, Conference Room 412
Presider:
Susan A. Kirch, New York University

Harold B. Short, University of Michigan
Morten Lundsgaard, University of Illinois at Urbana-Champaign

S11.14.2 Assessing Evaluative Thinking Capability of High-School Science Students in the Multicultural Israeli Context
Tami Nahum, University of Haifa-Oranim, Israel
Ibtesam Azaiza, University of Haifa-Oranim, Israel
Naji Kortam, University of Haifa-Oranim, Israel
David Ben-Chaim, University of Haifa-Oranim, Israel
Uri Zoller, University of Haifa-Israel

S11.14.3 A Competence Test in the Field of Nature of Science and Nature of Scientific Inquiry
Irene Neuman, University Duisburg-Essen
Gary M. Holliday, Illinois Institute of Technology, Chicago
Hans E. Fischer, University Duisburg-Essen
Alexander Kauertz, University Duisburg-Essen
Judith S. Lederman, Illinois Institute of Technology, Chicago
Norman G. Lederman, Illinois Institute of Technology, Chicago

S11.14.4 Looking Forward: Teaching the Nature of Science of Today and Tomorrow
Y. Debbie Liu, Harvard
Tina A. Grotzer, Harvard

Strand 11: Cultural, Social, and Gender Issues
S11.15 Symposium: Theoretical and Methodological Coherence in Conceptualizing Identity in Science Education
1:15pm – 2:45pm, Conference Room 411
Discussants:
Gale Seiler, McGill University
Anjali Abraham, McGill University
Allison Gonsalves, McGill University
Phoebe Jackson, McGill University
Janine Metallic, McGill University
Stephen Peters, McGill University
Lilian Pozzer-Ardenghi, McGill University

Strand 15: Policy
S11.16 Symposium: A Pathway to College Readiness: Science College Board Standards for College Success
1:15pm – 2:45pm, Conference Room 415
Christopher C. Lazzaro, The College Board
Danielle Luisier, The College Board
Cynthia Hamen Farrar, The College Board
Melanie M. Cooper, Clemson University
Robert W. Ridky, National Education Coordinator U.S Geological Survey
George E. DeBoer, AAAS Project 2061
Nancy B. Songer, University of Michigan

Concurrent Session #12
3:00pm – 4:30pm

Strand 1: Science Learning, Understanding and Conceptual Change
S12.1 SC-Paper Set: Technological Innovations to Support Learning
3:00pm – 4:30pm, Conference Room 413
Presider:
Paul Preczewski, Syracuse University

S12.1.1 Comparing Students’ Performance and Reasoning with Physical and Virtual Manipulatives to Learn about Pulleys
Jacquelyn J. Chini, Kansas State University
Amy Rouinifar, Florida State University
Adrian Carmichael, Kansas State University
Sadhana Puntambekar, University of Wisconsin - Madison
N. Sanjay Rebello, Kansas State University
S12.1.2 Computer-Supported Collaborative Scientific Conceptual Change: Learning Sciences in CSCL Learning Environments
Lei Liu, University of Pennsylvania
Cindy E. Hmelo-Silver, Rutgers University

S12.1.3 Qualitative Analysis of the Effects of Sequence of Physical and Virtual Activities on Student Conceptual Understanding in Mechanics
Adrian Carmichael, Kansas State University
Jacquelyn J. Chini, Kansas State University
Sadhana Puntambekar, University of Wisconsin-Madison
N. Sanjay Rebello, Kansas State University

S12.1.4 Connecting Tacit Understanding from Video Games to Formalized Vector Concepts
Cynthia M. D'Angelo, Arizona State University
Douglas B. Clark
Brian C. Nelson, Arizona State University
Kent Slack, Arizona State University
Muhsin Menekse, Arizona State University

Strand 2: Science Learning: Contexts, Characteristics and Interactions
S12.2 Symposium: Incorporating Social Foundations of Learning into Design: Cases and Design Principles from Two Efforts to Re-design Existing Curriculum Kits
3:00pm – 4:30pm, Salon D
Presenters:
Carrie T. Tzou, University of Washington Bothell
Philip Bell, University of Washington
John Bransford, University of Washington
Naney Vye, University of Washington
Giovanna Scalone, University of Washington
Kari Shutt, University of Washington
Katie Van Horne, University of Washington
Amy Winstanley, Bellevue School District, WA
Tiffany Lee, University of Washington

S12.3 Related Paper Set: Argumentation in Different Science Classrooms Learning Environment Based on Research Experience from Four Countries
3:00pm – 4:30pm, Conference Room 402
Presider: Avi Hofstein
Discussant: Joseph Kracjik

S12.1.1 Stimulating Peer Argumentation in the School Science Laboratory – Exploring the Effect of Laboratory Task Formats
Per Kind, Durham University, England
Janine Wilson, Durham University, England
Avi Hofstein, The Weizmann Institute of Science, Israel
Venessa Kind, Durham University, England

S12.3.2 Argumentation in the Chemistry Laboratory: Inquiry and Confirmatory Experiments
Dvora Katchevich, The Weizmann Institute of Science, Israel
Rachel Mamlok-Naaman, The Weizmann Institute of Science, Israel
Avi Hofstein, The Weizmann Institute of Science, Israel

S12.3.3 Assessing Understanding of Argument: Investigating High School Students’ Arguments and Implications for Classroom Practice
Ebru Kaya, Middle East Technical University, Turkey
Sibel Erduran, University of Bristol, United Kingdom
Pinar Cetin, Middle East Technical University, Turkey

S12.3.4 Model-Based School Scientific Argumentation with Prospective Science Teachers
Agustin Aduriz-Bravo, University of Buenos Aires, Argentina

S12.3.5 Fostering Constructive Criticism in a High School Biology Classroom: Understanding the Social Dynamics of Argumentation
Ellice Forman, University of Pittsburgh

Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies
S12.4 Symposium: Teacher Knowledge and Science Teaching—Effects on Students’ Learning in Elementary and Secondary School Science
3:00pm – 4:30pm, Conference Room 403
Thilo Kleickmann, Max-Planck-Institute for Human Development Lentzeallee, Germany
Alexander Kauertz, University of Education, Germany
Anne Ewerhardy, University of Muenster
Katharina Fricke, University of Duisburg-Germany
Kim Lange, University of Muenster, Germany
Anrika Ohle, University of Duisburg-Essen Department of Physics Schützenhahn 70 D-45127 Essen Germany
Kathleen Roth, BSCS
Hans E. Fischer, University of Duisburg-Germany
Kornelia Möller, University of Muenster Seminar, Germany

2010 NARST Annual International Conference 107
Strand 7: Pre-service Science Teacher Education
S12.8 Symposium: Science Teacher Recruitment and the Robert Noyce Teacher Scholarship Program: Promising Strategies and Possible Connections 3:00pm – 4:30pm, Conference Room 407
Presenters:
Steven S Fletcher, St. Edward’s University
Julie A. Luft, Arizona State University
Michael Beeth, University of Wisconsin Oshkosh
Ann Cavallo, University of Texas at Arlington
Juanita Jo Matkins, College of William and Mary
Jacqueline T. McDonough, Virginia Commonwealth University
Laura Henriches, California State University - Long Beach
Lorelei Wood, Arizona State University

Strand 7: Pre-service Science Teacher Education
S12.9 SC-Paper Set: Ethical and Socio-Scientific Instruction and Parental Involvement in Pre-Service Teacher Education 3:00pm – 4:30pm, Conference Room 409
Presider:
Felicia M. Moore-Mensah, Teachers College

S12.9.1 Turkish Preservice Science Teachers’ Perceptions and Adaptation of Socio-scientific Issues into the Science Curriculum
Yilmaz Kara, Karadeniz Technical University
Mustafa S Topcu, Yuzuncu Yil University

S12.9.2 Preservice Science Teachers’ (PST) Argumentation Skills: Impact of Socioscientific-Based Instruction
Mustafa S Topcu, Yuzuncu Yil University
Yilmaz Kara, Karadeniz Technical University

S12.9.3 The Use of Parent Involved Take-Home Science Activities during Student Teaching: Understanding the Challenges of Implementation
Jill Zarazinski, State University of New York College at Brockport

Strand 8: In-service Science Teacher Education
S12.10 SC-Paper Set: Innovative Science Content and Professional Development 3:00pm – 4:30pm, Salon C
Presider:
Yael Bamberger, University of Michigan
S12.10.1 Correlated Science and Mathematics: A Model for Professional Development of Grades 5-8 Science and Mathematics Teachers
Sandra S West, Texas State
Sandra T. Browning, University of Houston – Clear Lake

S12.10.2 The Role of Teachers’ Barriers in Integrating New Ideas into the Curriculum: The Case of Nanscale Science and Technology
Bamberger M. Yael, University of Michigan
Joseph S Krajcik, University of Michigan

S12.10.3 The Impact of Professional Development: Teaching an Enhanced Multimodal Grade 6 Science Unit on Extreme Environments
Christine D. Tippett, University of Victoria
Larry D. Yore, University of Victoria

S12.10.4 Teachers Learn about Biological Energy Transfer at the SUN Project Workshop
Ann Batiza, Milwaukee School of Engineering
Mary Gruhl, Milwaukee School of Engineering
Tim Herman, Milwaukee School of Engineering
Dave Nelson, UW-Madison
Tom Harrington, Bacon Academy
Marisa Roberts, Whitefish Bay High School
Donna LaFlamme, St. Dominic’s School
Mary Anne Haasch, Wauwatosa West High School
Jonathan Knopp, IB International
Gina Vogt, Brown Deer High School

Strand 8: In-service Science Teacher Education
S12.11 SC-Paper Set: Nature of Science and Inquiry
3:00pm – 4:30pm, Conference Room 408
Presider:
Kristy Loman Chiodo, University of South Florida

S12.11.1 Teachers Translating Inquiry-Based Curriculum to the Classroom Following Professional Development: A Pilot Study
Daniel K. Capps, Cornell University
Barbara A. Crawford, Cornell University

S12.11.2 Teachers’ Pedagogical Use of Inquiry Related Words - Conflating Means and Ends
Jakob Gyllenpalm, Stockholm University
Per-Olof Wickman, Stockholm University
Sven-Olof Holmgren, Stockholm University

S12.11.3 Comparison between Chinese and United States Science Teachers’ Views of Nature of Science and Scientific Inquiry
Jingying Wang, Capital Normal University (Beijing, China)
Norman G. Lederman, Illinois Institute of Technology

S12.11.4 Frameworks for an Inquiry-focused, Early-Career, Science Teacher Professional Development Program: Developing a Teaching-Through-Inquiry Learning Progression
Bruce E. Herbert, Texas A&M University
Hye-Jeong Kim, Texas A&M University
Cathleen C. Loving, Texas A&M University
Susan Pedersen, Texas A&M University

S12.12 SC-Paper Set: Assessing Student Conceptual Understanding
3:00pm – 4:30pm, Conference Room 410
Presider:
Joseph Zawicki, Buffalo State College

S12.12.1 Optimizing Force Concept Inventory Data Collection and Analysis through Innovative Data Cleaning, Data Plotting and Utilization of Rasch ZSTD and MNSQ Fit Statistics: Implications for the Collection and Analysis of Science Education Test and Survey Data
William J. Boone, Miami University
Lynn Bryan, Purdue University
Melissa S Yale, Purdue University
Mark P. Haugan, Purdue University
Deborah Bennett, Purdue University
Gregory Applegate, Purdue University

S12.12.2 Evaluation of Students’ Thermal Conceptual Understanding in Everyday Contexts
Hye-Eun Chu, Nanyang Technological University
David F. Treagust, Curtin University of Technology
A. L. Chandrasegaran, Curtin University of Technology
Shelley Yeo, Curtin University of Technology
Marjan Zadnik, Curtin University of Technology

S12.12.3 Addressing Misconceptions in Evolution at the High School Level
Kristin Nagy Catz, University of California, Berkeley
Laura J. Lenz, University of California, Berkeley

S12.12.4 Engineering Design and Conceptual Change in Science: Addressing Thermal Energy and Heat Transfer in Eighth Grade
Christine G. Schnittrka, University of Kentucky
Randy L. Bell, University of Virginia
Strand 10: Curriculum, Evaluation, and Assessment
S12.13 SC-Paper Set: Developing Technology-based Science Assessment
3:00pm – 4:30pm, Conference Room 412

Presider:
Xiufeng Liu, University at Buffalo

S12.13.1 Human VS Computer Diagnosis of Student Knowledge of Natural Selection: Testing the Efficacy of Lexical Analyses of Open Response Text
Ross H. Nehm, The Ohio State University
Hendrik Haertig, NWU-Essen, Germany
Judith S Ridgway, The Ohio State University

Melissa L. Shirley, University of Louisville
Karen E. Irving, The Ohio State University

Silin Wei, East China Normal University
Xiufeng Liu, State University of New York at Buffalo
Gail Zichitella, State University of New York at Buffalo

S12.13.4 Insight into Student Thinking in STEM: Lessons Learned from Lexical Analysis of Student Writing
Mark Urban-Lurain, Michigan State University
Kevin C. Haudek, Michigan State University
Rosa A. Moscarella, Michigan State University
John E. Merrill, Michigan State University

S12.15 Symposium: Creating an Electronic Presence for NARST
This session serves as a call for an Ad-Hoc Committee and Members. This new ad hoc committee is charged with exploring and providing the NARST board with recommendations for technology use within the organization that would facilitate communication, collaboration, and research. Technologies exist that would enable NARST members worldwide to communicate throughout the year as well as in different ways during the annual conference. For example, technology could enhance the annual conference experience and share important aspects of the conference via video technology to members worldwide who could not attend the conference. New and existing technologies could be used for creating learning communities, sharing research databases and research instruments, and publication of manuscripts and other materials. This NARST electronic presence committee is just forming and beginning its task of making a recommendation to the board. All interested NARST members are encouraged to attend this brainstorming session.

3:00pm – 4:30pm, Conference Room 501
Presider:
Charlene M. Czerniak, The University of Toledo

NARST Executive Board Meeting #3
5:30pm – 10:30pm, Salon C
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. If you feel that you need the Abstracts in paper format, please go to the Conference Registration center and request this. We hope that you will be provided with the information you need to have a positive NARST Conference experience while supporting our efforts to protect our environment.
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