2008 NARST
Annual International Conference
Impact of Science Education Research on Public Policy
March 30-April 2
Baltimore Marriott Waterfront Hotel
Baltimore, MD
Studies in SCIENCE EDUCATION

Editors: Jim Ryder & Phil Scott,
University of Leeds, UK

Volume 44, 2 issues per year
Print ISSN: 0305-7267, Online ISSN: 1940-8412

The central aim of Studies in Science Education (SiSE) is to publish review articles of the highest quality which provide analytical syntheses of research into key topics and issues in science education. In addressing this aim, the Editors and Editorial Advisory Board, are guided by a commitment to:

• maintaining and developing the highest standards of scholarship associated with the journal.

• publishing articles from as wide a range of authors as possible, in relation both to professional background and country of origin.

• publishing articles which serve both to consolidate and reflect upon existing fields of study and to promote new areas for research activity.

Related Titles of Interest

International Journal of Science Education
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University of Reading, UK
Volume 30, 2008, 15 issues per year
Print ISSN: 0950-0693, Online ISSN: 1464-5289
www.informaworld.com/ijsse

Environmental Education Research
Editor: Alan Reid, University of Bath, UK
Volume 14, 2008, 5 issues per year
Print ISSN: 1350-4622, Online ISSN: 1469-5871
www.informaworld.com/eer

Research in Science and Technological Education
Editor: Chris Botton, University of Hull, UK
Volume 26, 2008, 3 issues per year
Print ISSN: 0263-5143, Online ISSN: 1470-1138
www.informaworld.com/riste

Visit the Journal’s homepage at:
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Acknowledgments

The following members of the Program Committee helped in preparing and editing the 2008 NARST Annual International Conference Program Book.

Penny J. Gilmer, President and Program Committee Chair
Charlene M. Czerniak, President-elect and Program Committee Co-Chair
Jonathan Osborne, Past President
William C. Kyle, Jr., Executive Director
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Guidelines for Presenters

General Responsibilities of Presenters at the Meeting
• Go to the designated room early.
• Greet the presider/discussant.
• If you plan to use a computer file in your presentation, 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.
• Stay within the designated time limit.
• Invite audience questions.

Session Formats
Related Paper Sets and Paper Sets Grouped by Strand Coordinators
In a paper session, the presider/discussant introduces the speakers, who then present an abbreviated version of their papers. Generally, each paper will be allotted 15 minutes for presentation, followed by 5 minutes of questions, critique, and/or discussion. The discussant and audience will use the remaining time for additional discussion, general review, and suggestions for further research. If the paper is not on the NARST Proceedings 2008 CD distributed at the conference, then a copy of each paper must be disseminated during or immediately following the session.

Symposia
A symposium usually involves a panel of experts or stakeholders who examine a specific theme or issue. The proposer controls presentations, discussion, and questioning with the assistance of the presider/discussant. A presider helps with arranging the technology, helping keep the program on time, and introducing the presenters, if needed. In some cases, a discussant makes brief and cogent remarks on each paper with suggestions for future research. Discussion should promote the expression of alternative viewpoints and theoretical positions.

Interactive Poster Sessions
Six to 15 posters will be assigned to one room. Presenters at the interactive poster sessions will be assigned a presentation area within a large room. The session will be chaired by a presider who will give each interactive poster session presenter or team of presenters two minutes to introduce themselves and give a brief description of their paper. After which participants will browse among the posters. At the end of the poster session, a presider will provide a summary of the set of posters grouped in the session. The interactive poster sessions will run for 90 minutes.

Guidelines for Presiders and Discussants
We have accommodated most sessions with a presider, whose role is detailed below. For sessions without discussants, we are counting on the presider and presenters to set aside time for discussion so that the audience participants can contribute to a lively 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.

Notes on Session Types
Related Paper Sets and Paper Sets Grouped by Strand Coordinators
• Presider and presenters will negotiate the organization of the session before it starts.
• Time should be left at the end for discussant comments and/or audience participation.

Symposia
Presentations, discussion, and questions are controlled by the presenters, with the assistance of the presider or discussant, if needed.

Interactive Poster Sessions
Six to 15 papers are assigned to one room. If there is a presider, s/he introduces and closes the session. Each first author presents a brief (less than 2 minutes) overview of the research. After the overviews, audience members circulate throughout the room to view posters and interact with presenters. The presider should allow time at the end of the session for large group discussion.
General Information

Information About NARST
The National Association for Research in Science Teaching was founded in 1928 for the purpose of promoting research in science education at all educational levels and disseminating the findings of this research in such ways as to improve science teaching. The Association is incorporated as a non-profit corporation in the State of Minnesota. The official publication is the Journal of Research in Science Teaching.

NARST encourages the conduct and presentation of the results of a wide variety of investigations in all aspects of science education, including action, historical, philosophical, ethnographic, experimental, and evaluative studies. Reports of empirical research, critical reviews, and theoretical works are encouraged. Some research areas of interest to NARST members include curriculum development and organization, assessment and evaluation, learning theory, teacher education, programs for exceptional students (special needs and talents), equity studies, and methods of teaching.

NARST Mission Statement
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.

How NARST Keeps Its Members Informed
• Ten issues of the Journal of Research in Science Teaching (JRST). 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 Proceedings. A proceedings volume is distributed at the annual international conference. This volume includes a compiled list of abstracts (on CD-ROM) for each annual international conference plus copies of accepted papers submitted 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 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 organization. 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 Proceedings 2008 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 Proceedings 2008 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 Proceedings 2008 CD.

Interactive Poster Sessions Grouped by Strand Coordinators
This format offers presenters the opportunity to display their work graphically in a smaller setting than the 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. Six to 15 posters grouped by strand will be displayed in one room. Each presenter will have 2 minutes to present a brief overview of his or her research. At the conclusion of the brief presentations, audience members will have approximately 30 minutes to circulate throughout the room to view the posters and interact with the presenters. At the conclusion of this time, a large group discussion will be facilitated by the session presider. 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 Proceedings 2008 CD.
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

A Special Thanks to our Sponsors and Exhibitors

Open University Press
Routledge
Sense Publishers
Springer

We acknowledge John Wiley & Sons and their work as publisher of the
Journal of Research in Science Teaching - JRST

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Research Coordinator
Randy Yerrick

Editors, JRST
J. Randy McGinnis
Angelo Collins

NSTA Representative
Jonathan Singer
"NARST: a lived history"

This forthcoming article in Cultural Studies of Science Education is now available in Online First.

Volume 3:2 - Abstract
In this Forum, we construct a history of the National Association for Research in Science Education (NARST) through the analysis of documents and through the personal perspectives of individuals. The history of NARST is inseparable from the biography of the individuals through whose lives it was produced and reproduced. The history of NARST is a living history that both shapes and was shaped by the biographies of its members.

Visit the Springer booth and take advantage of the 20% book discount!

New Editor-in-Chief for Research in Science Education

We are pleased to announce that Dr. Stephen M. Ritchie, Queensland University of Technology, Brisbane, Australia, has started as the new Editor-in-Chief of Research in Science Education as of January 1, 2008.

A thank you to Professor Cam McRobbie
We would like to take this opportunity to express our profound gratitude to Prof. Cam McRobbie, Editor-in-Chief for the journal in 1978 (together with Colin Power) and from 1995 to 2007.

Listed in Social Sciences Citation Index

We are very thankful for the work he has performed in making the journal into an internationally recognized publication.
2009 NARST Annual International Conference

Garden Grove - (Adjacent to Anaheim, CA, USA)

The Program Chair invites NARST members and others to plan to participate in the 2009 NARST Annual International Conference and especially urges all members to start planning program proposals now during this year’s conference.

VENUE: Hyatt Regency Orange County, 11999 Harbour Blvd., Garden Grove, CA, USA.
DATES: Thursday, April 17 – Wednesday, April 21, 2009

SUBMISSION DEADLINE: The Program Chair or designate must receive your program proposals for the Annual International Conference in 2009 by August 15, 2008 to be reviewed. The deadline allows sufficient time for processing and evaluating the many proposals. The original call for proposals will appear on the NARST website in June 2008.

BACKGROUND INFORMATION: Welcome to the City of Garden Grove. Garden Grove is a vibrantly progressive and growing city located just south of Los Angeles in Orange County, California. City motto, “The City of Youth and Ambition,” accurately reflects this culturally diverse community of over 170,000 people. Garden Grove is home to four annual cultural festivals that celebrate the Vietnamese, Korean, Arabic, and American heritage. Garden Grove’s Strawberry Festival, nearing 50 years old, is the largest community-based Memorial Day event in the western United States.

Garden Grove is conveniently located less than one mile from Disneyland, seven miles from Knott’s Berry Farm, nine miles from local beaches, and 10 miles from John Wayne Airport.

Future Meeting Dates for NARST, NSTA, and AERA

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<th>Year</th>
<th>NSTA</th>
<th>AERA</th>
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<td>2009</td>
<td>April 2 – 5</td>
<td>April 13 – 17</td>
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<td></td>
<td>Indianapolis</td>
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<td>Hyatt Regency Orange County</td>
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<td>2010</td>
<td>March 17 – 20</td>
<td>April 30 – May 4</td>
<td>March 21 – 24</td>
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<td></td>
<td>Philadelphia</td>
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<td>2011</td>
<td>April 7 – 10</td>
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<td></td>
<td>San Francisco</td>
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<td>2012</td>
<td>April 13 – 17</td>
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<td>TBD</td>
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2007 Strand Coordinators

STRAND 1  Science Learning, Understanding, and Conceptual Change
          Eva Toth, Catherine Milne

STRAND 2  Science Learning: Contexts, Characteristics, and Interactions
          Tracy Hogan, Wesley Pitts

STRAND 3  Science Teaching – Primary School (Grades preK-6)
          Mark Guy, Jan H. van Driel

STRAND 4  Science Teaching – Secondary School (Grades 5-12)
          Jo Anne Ollerenshaw, Lisa Martin-Hansen

STRAND 5  College Science Teaching (Grades 13-20)
          Peter Garik, Kate Popejoy

STRAND 6  Science Learning in Informal Contexts
          Shawn Rowe, Tali Tal

STRAND 7  Pre-service Science Teacher Education
          Rola Khishfe, Christina Schwarz

STRAND 8  In-Service Science Teacher Education
          Patricia Morrell, Martina Nieswandt

STRAND 9  Reflective Practice
          Tamara Nelson, Jerine Pegg

STRAND 10 Curriculum, Evaluation, and Assessment
          Kimberly Tanner, Bruce Waldrip

STRAND 11 Cultural, Social, and Gender Issues
          Felicia Moore, Magnia A. George

STRAND 12 Educational Technology
          Barbara Hug, Hsin-Kai Wu

STRAND 13 History, Philosophy, and Sociology of Science
          Mike Smith, Larry Scharmann, Agust’n Adúriz-Bravo

STRAND 14 Environmental Education
          Julia Lambert, Rita Anne Hagevik, Eleanor Abrams
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<th>Program Proposal Reviewers</th>
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<td>Abd-El-Khalick, Fouad</td>
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2008 NARST Annual International Conference
NARST Presidents

1928  W. L. Eikenberry
1929  W. L. Eikenberry
1930  W. L. Eikenberry
1931  Eliott R. Downing
1932  Eliott R. Downing
1933  Francis D. Curtis
1934  Ralph K. Watkins
1935  Archer W. Hurds
1936  Gerald S. Craig
1937  Walter G. Whitman
1938  Hanor A. Webb
1939  John M. Mason
1940  Otis W. Caldwell
1941  Harry A. Carpenter
1942  G. P. Cahoon
1943  Florence G. Billig
1944  Florence G. Billig
1945  Florence G. Billig
1946  C. L. Thield
1947  Earl R. Glenn
1948  Ira C. Davis
1949  Joe Young West
1950  N. Eldred Bingham
1951  Betty Lockwood
1952  Betty Lockwood
1953  J. Darrell Barnard
1954  George G. Mallinson
1955  Kenneth E. Anderson
1956  W. C. Van Deventer
1957  Waldo W. Blanchet
1958  Nathan S. Washon
1959  Thomas P. Fraser
1960  Vaden W. Miles
1961  Clarence H. Boeck
1962  Herbert A. Smith
1963  Ellsworth S. Obourn
1964  Cyrus W. Barnes
1965  Frederic B. Dutton
1966  Milton P. Pella
1967  H. Craig Sipe
1968  John M. Mason
1969  Joseph D. Novak
1970  Willard D. Jacobson
1971  Paul D. Hurds
1972  Frank X. Sutman
1973  J. David Lockard
1974  Wayne W. Welch
1975  Robert E. Yager
1976  Ronald D. Anderson
1977  O. Roger Anderson
1978  Roger G. Olstad
1979  James R. Okey
1980  John W. Renner
1981  Stanley L. Helgeson
1982  Stanley L. Helgeson
1983  Carl F. Berger
1984  Ann C. Howe
1985  Errole Thompson
1986  David P. Butts
1987  James P. Barufaldi
1988  Linda DeTure
1989  Patricia Blosser
1990  William G. Holliday
1991  Jane Butler Kahle
1992  Russell H. Yeany
1993  Emmett L. Wright
1994  Kenneth G. Tobin
1995  Dorothy L. Gabel
1996  Barry J. Fraser
1997  Thomas R. Koballa, Jr.
1998  Audrey B. Champagne
1999  Joseph S. Krajcik
2000  David F. Treague
2001  Sandra K. Abell
2002  Norman G. Lederman
2003  Cheryl L. Mason
2004  Andy (Charles) Anderson
2005  John R. Staver
2006  James Shymansky
2007  Jonathan Osborne
2008  Penny J. Gilmer

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

Paul Joslin 1975 – 1980
Bill Holliday 1980 – 1985
Glenn Markle 1985 – 1990
John Staver 1990 – 1995
Art White 1995 – 2000
David Haury 2000 – 2002
John Tillotson 2002 – 2007
Bill Kyle 2007 – 2012

NARST Emeritus Members

Gerald L. Abegg
Michael L. Agin
Andrew Ahlgren
Glen Aikenhead
Guilford H. Bartlett, Jr.
Glenn D. Berkheimer
Paul J. Black
Ted Boyston
David P. Butts
Jerry J. Doyle
Peter J. Fensham
Monica G. M. Ferguson-Hessler
Ronald Good
Richard E. Haney

Gerry D. Haukoos
Stanley L. Helgeson
Ann C. Howe
Paul H. Joslin
Ehud Jungwirth
Reuven Lazarowitz
Ivo E. Lindauer
Jacqueline Mallinson
Floyd E. Mattheis
Victor J. Mayer
Peeter A. Miranda
Joseph D. Novak
Roger G. Olstad
Mary Ellen Quinn
William C. Ritz
Ryda D. Rose
John F. Schaff
Donald J. Schmidt
H. Craig Sipe
Joan H. Solomon
Martin D. Stewart
David R. Stronck
Frank X. Sutman
Joyce Swartney
J. Nathan Swift
Pinchas Tamir
Burton E. Voss
Russell H. Yeany
New and Popular Books

Learning Science Teaching: Developing A Professional Knowledge Base
Paul Denley, University of Bath, UK
Keith Bishop, University of Bath, UK
This book argues that highly accomplished science teachers are also continually learning science teachers. It stresses the importance of learning through others, by participation in communities of science practitioners, as well as individual learning through classroom research.

2007 / 240 pp / 0335222358 / Paperback $43.95

Developing Scientific Literacy: Using News Media in the Classroom
Ruth Jarman, Queen’s University Belfast, UK
Billy McClune, Queen’s University Belfast, UK
This is a timely book which will be particularly useful for students and practicing teachers of science and English / media studies in secondary schools and colleges and for those with responsibilities in initial teacher training and continuing professional development.

2007 / 232 pp / 0335217958 / Paperback $45.95

Teaching and Learning Primary Science with ICT
Paul Warwick et al, University of Cambridge, UK
This book provides a range of insights into pupils’ learning relevant to the use of information and communications technology (ICT) in primary science. The contributors, who are all experts in their field, draw on practical and theoretical perspectives. It is essential reading for students in science education, and for teachers who want to use new technology to improve learning in their science classrooms.

2006 / 216 pp / 0335218946 / Paperback $45.95

Science for Primary School Teachers
Helena Gillespie, University of East Anglia, UK
Rob Gillespie, Wymondham High School, Norfolk, UK
This book is intended to be a core text for primary school teachers in training, induction and beyond. It is primarily aimed at those who are not science specialists, providing them with an accessible and useful tool to enable them to gain confidence in their ability to teach science successfully.

2007 / 216 pp / 0335220150 / Paperback $45.95

Developing Thinking; Developing Learning
Debra McGregor, Educational Consultant, USA
This is an indispensable guide to thinking skills in schools today, and is key reading for education studies students, teachers and trainee teachers, and educational psychologists.

2007 / 344 pp / 033521780X / Paperback $43.95

Assessment for Learning
Paul Black et al, King’s College London, UK
“This is a surprising and welcome book... a heartening read that shows the power of assessment for learning and the potential for academics and teachers jointly to put into practice ideas that can improve classroom learning and teaching.” TES

2003 / 172 pp / 0335212972 / Paperback $43.95

www.openupusa.com
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.

<table>
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<th>Year</th>
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<td>John W. Renner</td>
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<td>2006</td>
<td>David Treagust</td>
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JRST Award

The JRST Award is given annually to the article published in the *Journal of Research in Science Teaching* that is judged to be the most significant for that year.

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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.

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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.

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<tr>
<th>Year</th>
<th>Awardee</th>
<th>Major Professor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>René Stofflett</td>
<td>Dale R. Baker</td>
</tr>
<tr>
<td>1993</td>
<td>Julie Gess-Newsome</td>
<td>Norman G. Lederman</td>
</tr>
<tr>
<td>1994</td>
<td>Carolyn W. Keys</td>
<td>Burton E. Voss</td>
</tr>
<tr>
<td>1995</td>
<td>Jerome M. Shaw</td>
<td>Edward Haertel</td>
</tr>
<tr>
<td>1996</td>
<td>Christine M. Cunningham</td>
<td>William L. 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 Krajcik</td>
</tr>
<tr>
<td>2004</td>
<td>David L. Fortus</td>
<td>Ronald Marx and Joseph Krajcik</td>
</tr>
<tr>
<td>2005</td>
<td>Thomas Tetter</td>
<td>Gail M. Jones</td>
</tr>
<tr>
<td>2006</td>
<td>Stacy Olitsky</td>
<td>Kenneth Tobin</td>
</tr>
<tr>
<td>2007</td>
<td>Julia Plummer</td>
<td>Joseph S. Krajcik</td>
</tr>
</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>Reneé 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>
</tr>
<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. Nakhleh</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>Heidí Car lone</td>
</tr>
<tr>
<td></td>
<td>Gregory J. Kelly</td>
<td>2007</td>
<td>Bryan A. Brown</td>
</tr>
</tbody>
</table>
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>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>Livingston S. Schneider and John W. Renner</td>
</tr>
<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>
</tr>
<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>
</tr>
<tr>
<td></td>
<td>Charles Porter and Russell H. Yeany</td>
</tr>
<tr>
<td>1985</td>
<td>Dan L. McKenzie and Michael J. Padilla</td>
</tr>
<tr>
<td></td>
<td>Margaret Walkosz and Russell H. Yeany</td>
</tr>
<tr>
<td></td>
<td>Kevin C. Wise and James R. Okey</td>
</tr>
<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>
</tr>
<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>
NARST Leadership Team & Committees
2007-2008

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(10) Edward Robeck ecrobeck@salisbury.edu

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(10) Sibel Erduran Mortimer@netuno.lss.ufmg.br
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(10) Uri Zoller uriz@research.haifa.ac.il

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(09) Wesley Pitts wp03@verizon.net
(08) Mark Guy mark_guy@und.nodak.edu
(09) Jan H. van Driel Driel@iclon.leidenuniv.nl
(08) Jo Anne Ollerenshaw jolle@FoxValley.net
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(10) Carla Zembal-Saul

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(09) Hedy Moscovici  
(10) Reneé Schwartz  
J. Randy McGinnis (JRST Co-Ed)  
Angelo Collins (JRST Co-Ed)

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Executive Director: Bill Kyle  
NSTA Research Director: Jonathan Singer

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**Members**
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(08) Mike Vitale  
(09) Martina Nieswandt  
(09) Troy Sadler  
(10) Julia V. Clark  
(10) Anita Roychoudhury

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President: Penny J. Gilmer  
Executive Director: Bill Kyle
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(08) Ann Howe achowe@earthlink.net
(08) Glen Aikenhead glen.akenhead@usask.ca
(08) John Rudolph jlrudolp@wisc.edu
(08) Norman Lederman ledermann@iit.edu
(08) Ronald Anderson Ronald.Anderson@Colorado.edu
(08) Sandra Abell AbellS@missouri.edu
(08) Saouma BouJaoude boujaoud@aub.edu.lb
(08) Steve Oliver soliver@uga.edu
(08) William Holliday holliday@umd.edu
Schedule at a Glance

Saturday, March 29
9:00 AM – 5:00 PM  NARST Executive Board Meeting #1

Sunday, March 30
8:00 – 12 noon  NARST Executive Board Meeting #2
8:00 – 11:30 AM  Two of the three Pre-Conference Workshops
8:00 – 2 PM  One of the three Pre-conference Workshops
10:00 – 10:15 AM  Break
12:30 – 2:00 PM  Session #1
2:00 – 2:30 PM  Break
2:30 – 4:00 PM  Session #2
4:15 – 5:45 PM  Session #3
6:00 – 7:00 PM  Mentor-Mentee Nexus
7:00 – 9:00 PM  Presidential/Welcome Reception

Monday, March 31
7:00 – 8:15 AM  Committee Meetings
8:30 – 9:45 AM  Plenary #1: Marcia Linn
9:45 – 10:15 AM  Break
10:15 – 6:15 PM  Concurrent Sessions
12:00 – 12:45 PM  NARST Business Meeting (box lunches provided for attendees who have signed up)
1:00 – 2:30 PM  Session #5
2:30 – 3:00 PM  Break
3:00 – 4:00 PM  Session #6
4:45 – 6:15 PM  Session #7
6:30 – 7:30 PM  Graduate Student Forum
6:30 – 8:30 PM  JRST Editorial Board Meeting/Dinner (Meeting open/Dinner by invitation only)

Tuesday, April 1
7:00 – 8:15 AM  Committee Meetings
8:30 – 10:00 AM  Concurrent Sessions
8:30 – 10:00 AM  Session #8
10:00 – 10:30 AM  Break
10:30 – 11:45 AM  Plenary #2: Peter Fensham
12:00 – 1:45 PM  Awards Luncheon
2:00 – 5:30 PM  Concurrent Sessions
2:00 – 3:30 PM  Session #9
3:30 – 4:00 PM  Break
4:00 – 5:30 PM  Session #10
5:00 – 6:00 PM  Research in Science Education (RISE) Editorial Board Meeting
5:45 – 6:45 PM  New Researcher and Junior Faculty Early Career Discussion
7:00 – 9:00 PM  Equity Dinner off site
8:00 – 10:00 PM  Social – FARSE

Wednesday, April 2
7:00 – 8:15 AM  Strand Meetings
8:30 – 12:00 PM  Concurrent Sessions
8:30 – 10:00 AM  Session #11
10:00 – 10:30 AM  Break
10:30 – 12:00 PM  Session #12
12:30 – 4:00 PM  NARST Executive Board Meeting #3
20% conference discount on all orders

The World of Science Education
A collection of six edited volumes each of which highlights research in a key region of the world (North America, Europe, Asia, Australasia, Central & South America and the Caribbean, Africa and the Middle East). Science Education Research in North America out this April.

Understanding and Developing Science Teachers
Pedagogical Content Knowledge John Loughran, Amanda Berry and Pamela Mulhall

The Culture of Science Education: Its History in Person Kenneth Tobin and Wolff-Michael Roth

Teaching Scientific Inquiry: Recommendations for Research and Implementation Richard A. Duschl and Richard E. Grandy (eds.)

The Re-Emergence of Values in Science Education
Deborah Corrigan, Justin Dillon and Richard Gunstone (eds.)

Science Inquiry, Argument and Language: A case for the Science Writing Heuristic Brian M. Hand (ed.)

Science Education in Context: An International Examination Of The Influence Of Context On Science Curricula Development And Implementation Richard A. Coll and Neil Taylor (eds.)

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For further information please contact Michel Lokhorst at the booth or via michel.lokhorst@sensepublishers.com
NARST Board of Directors Meeting 2
8:00AM – 12:00PM

Room: Essex A & B
Note. Breakfast begins at 7:30am for Board Members.

Pre-Conference Workshops
8:00AM – 11:30AM

**Equity and Ethics Committee Sponsored Pre-Conference Workshop:**
*Building a Community of Scholars in NARST: Gaining Strength through Diversity—Equity and Ethics Committee Sponsored*
Room: Dover B
Presider: Maria Rivera Maulucci

Presenters:
Felicia Moore
Alejandro Gallard

Facilitators:
Bryan Brown
Bhaskar Upadhyay
Shawn Holmes
Sanghee Choi
Line Augustin
Hsiao-Lin Tuan
Jing-Wen Lin
Alberto Rodriguez

8:00AM – 11:30PM

**Research Committee Sponsored Pre-Conference Workshop:**
*Research Agenda in Science Education: An Examination of Three Domains of Inquiry—Research Committee Sponsored*
Room: Dover A
Presider: Patricia Simmons

Vincent Lunetta
John Penick

8:00AM – 2:00PM

**Research Committee Sponsored Pre-Conference Workshop:**
*Using Video Cases to Support and Study Preservice Teacher Learning: Two Approaches*
Room: Dover C
Presider: Kathleen Roth, David Hammer

Catherine Chen
Karen Givvin
Leslie Atkins
Kathleen Schwille
Janet Coffey
Daniel Levin

AM Break
10:00AM – 10:15AM

Session 1
12:30PM – 2:00PM

**Equity and Ethics Committee Sponsored Workshop:**
*How Identity and Cultural Frameworks Shape Access to and Appropriation of Science Literacy*
Room: Dover A
Presider: Bryan Anthony Brown

Bryan Anthony Brown
Shawn Y. Holmes
Sanghee Choi
Crystal S. Gomillion
Edna Tan
Gillian U. Bayne

**Strand 1: Related Paper Set:**
*Earth Systems Education as a Platform for the Development of Thinking Skills and Scientific Understanding*
Room: Essex B
Presider: Ayush Gupta

**Paper 1:**
*Design-Based Research of an Oceanography Course for High School Earth Sciences Students*
Carmit Cohen
Nir Orion

**Paper 2:**
*System Thinking Skills at the Elementary School Level*
Orit Ben Zvi-Assaraf
Nir Orion

**Paper 3:**
*Characterization of High School Students’ System Thinking Skills in the Context of Earth Systems*
Tamar Basis
Nir Orion

**Paper 4:**
*Earth Systems Education in a Multidisciplinary Focus*
Nir Orion
Carmit Cohen

**Strand 2: Coordinator Organized Paper Set:**
*Motivation, Context, and Inquiry in Science Education*
Room: Laurel D
Presider: Alan Szeto

**Paper 1:**
*Science Anxiety Among Failing Students*
Ebru Kaya
Ali Yildirim
Paper 2: Describing the Construction Process of Models of Physical Phenomena: A Discourse-Based Analysis of Elementary Student Modeling Conversations
Loucas Louca
Zacharias Zacharia
Constantinos Constantinou

Paper 3: Can Inquiry Teaching Enhance Motivation and Inquiry Abilities of Different Achievers?
Kuei-Hsiang Chen
Hsiao-Lin Tuan
Chih-Chung Tsai
Jung-Chi Chang

Paper 4: Motivation Theory in Action: Using Saltwater Aquaria to Teach Science in Schools
Giuliano Reis
Shelley Ross
Catherine C. neé Pennachetti
Wolff-Michael Roth

Strand 5: Coordinator Organized Paper Set: Cognition and Modeling
Room: Essex A
Presider: Christopher Wilson

Paper 1: Assessing Students’ Understanding of Cladograms
Laura R. Novick
Kefyn M. Catley

Paper 2: Embedded Science Textbook Questions Used to Increase Comprehension
Cynthia Ghent
William Holliday

Paper 3: Lizards and Frogs or Lizards and Mammals: University Students’ Understanding of Most Recent Common Ancestry
Nancy P. Morabito
Kefyn M. Catley
Laura R. Novick

Paper 4: Undergraduates’ Abilities to Use Representations in Biology: Interpreting Phylogenetic Tree Thinking
Kristy L. Halverson
J. C. Pires
Sandra K. Abell

Strand 6: Related Paper Set: Research on Learning across Museum Contexts
Room: Laurel C
Presider: Jim Kisiel

Paper 1: Middle School Aged Students’ Interactions with 3-D Visualizations on a Spherical Display at a Science Museum
Celeste Barthel

Paper 2: Examining the Role of Affect in Visitor Engagement with Touch Tanks
Coral Gehrke
Shawn Rowe

Molly Phipps

Paper 4: Teacher Perspectives in Ocean Sciences Education: A Look at the SMILE-CIOSS Partnership
Bronwen Rice
SueAnn Bottoms
Shawn Rowe

Strand 7: Symposium: Recruitment of Science and Mathematics Teachers: National and International Perspectives on Issues and Policies
Room: Kent B
Presider: Abdulkadir Demir

Abdulkadir Demir
Charlene M. Czerniak
Fouad Abd-El-Khalick
Laura Moin
Valerie K. Otero
Frances Lawrenz

Strand 7: Coordinator Organized Paper Set: Approaches for Science Teacher Education II
Room: Kent C
Presider: Cherie McCollough

Paper 1: Concept Mapping to Promote Acquisition of Pedagogical Knowledge in Secondary Education Students
Barbara A. Austin

Paper 2: New Pre-Service Experiences in Authentic Settings: Family Learning Events in Science Teacher Education
Cherie McCollough

Paper 3: Crafting a Community-centered and Culturally Relevant Pedagogy in Preservice Science Teacher Education: A Collaborative Action Ethnography
Vicente C. Handa
Deborah Tippins
Norman F. Thomson
Paper 4: Enhancing Student Teachers’ Reflective Thinking Through Reflective Practices
Miwha Park
Gyoungho Lee
Jinwoong Song
Young-Shin Park

Strand 8: Coordinator Organized Paper Set: Fostering Educational Change
Room: Dover B
Presider: Avi Hofstein

Paper 1: Sustainable Improvements of Science Teaching Through the Development of Local School Science Cultures
Jan Solberg

Paper 2: Building Leadership to Support Teachers’ Integration of Technology-Enhanced Science Instruction
Libby F. Gerard
Jane B. Bowyer
Ronald W. Marx

Paper 3: Science Teacher Thinking About Mentoring as Revealed Through Written Cases
Thomas R. Koballa
Julie Kittleson
Leslie Bradbury
Michael Dias

Paper 3: The Impact of Gender on Conceptual Theoretical Framework and Cognition Across Cultures
Sharon Schleigh
Douglas Clark
Cynthia D’Angelo

Paper 4: Adopting Gender Stereotypes: Unraveling Bias From Student Evaluations of Their Teachers
Geoff Potvin
Zahra Hazari
Robert H. Tai
Philip M. Sadler

Strand 12: Coordinator Organized Paper Set: Teaching with Technologies
Room: Laurel B
Presider: Kate Popejoy

Paper 1: Pre-service Teachers’ Perspectives Towards Integrating Interactive Whiteboard into Elementary School Natural Science Course
Tzu-Hua Wang
Kai-Ti Yang

Paper 2: What Facilitates Integration of One-to-One Laptops According to Science Teachers?
Aviva Klieger
Yehuda Ben-Hur
Nurit Bar-Yossef

Paper 3: Pre-service Biology Teachers’ Use of Interactive Display Systems: Reform-Based Teaching or Chalk and Talk?
Christine G. Schnittka
Ian C. Binns
Randy L. Bell

Paper 4: Constructing Classroom Meaning with the Integration of Computer Technology into Science Teaching
Karthikeyan Subramaniam

Strand 13: Coordinator Organized Paper Set: Students’ Views of the Nature of Science
Room: Kent A
Presider: Lawrence C. Scharmann

Paper 1: Teaching Nature of Science to K-2 Students: What Can They Gain From Instruction and What Influences Changes in Their Views?
Valarie L. Akerson
Lisa A. Donnelly

Paper 2: Correlating Students’ Drawings of Scientists with Interview Data: Further Validation of E-DAST
Donna L. Farland
William F. McComas
**PM Break**  
2:00PM – 2:30PM

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**Session 2**  
2:30PM – 4:00PM

**International Committee Sponsored Session: ESERA: The Impact of Science Education Reform in Europe**  
Room: Dover A  
International Committee

Presiders: Mei-Hung Chiu and Justin Dillon  
Discussant: Manuela Welzel

**Paper 1: Relations Between Public Policy and the Research-Based-Design of Instructional Materials: Their Mutual Influences**  
Andree Tiberghien

**Paper 2: Danish Science Municipalities—A Convergence of Science Education Research and Political Trends**  
Jan Solberg

**Paper 3: A “Centre of Maths & Science Education” as a Specific Learning Site for Pupils, Pre- and In-Service Teacher and the General Public**  
Franz Bogner

**Paper 4: Swiss National Standards—A Political Mandate to Researchers in Science Education**  
Albert Zeyer  
Marco Adamina  
Francois Gingin  
Peter Labudde

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**Strand 1: Symposium: Pedagogical Content Knowledge Development as Conceptual Change**  
Room: Essex B

Presider: Eva E. Toth  
Discussant: Sandra K. Abell  
Peter Hewson  
Jan Van Driel  
Elizabeth Davis  
Michela Nelson  
Carrie Beyer

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**Strand 2: Coordinator Organized Paper Set: Modeling Scientific Practices in Science Classrooms**  
Room: Laurel D

Presider: Alan Oliveira

**Paper 1: Identity and Science Education: Sociocultural Approach**  
Ashraf Shady

**Paper 2: Meaningful Learning About Models and Modeling Using Authentic Chemical Practices as Contexts**  
Gjalt T. Prins  
Astrid M. W. Bulte  
Albert Pilot

**Paper 3: Development of Senior High School Students’ Modeling About Air Quality**  
Li-Fen Lin  
Ying-Shao Hsu  
Hsin-Kai Wu  
Fu-Kwun Huang

**Paper 4: Developing the Practice of Scientific Modeling through Classroom Discussions**  
Ayelet Weizman  
Yael Shwartz  
David Fortus  
Joe Krajcik

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**Strand 5: Coordinator Organized Paper Set: Reasoning and Assessment**  
Room: Essex A

Presider: Brett Merritt

**Paper 1: College Science Faculty’s Assessment Practices: Trends From the National Study of Postsecondary Faculty**  
Karleen R. Goubeaud

**Paper 2: Assessment-Informed Instructional Design to Support Principled Reasoning in College-Level Biology**  
Gail Richmond  
Joyce Parker  
Mark Urban-Lurain  
Brett Merritt  
John Merrill  
Ronald Patterson

**Paper 3: Principled Reasoning and Procedural Display in Undergraduate Biology Education: A Model for Assessment**  
Christopher D. Wilson  
Brett Merritt  
Andy W. Anderson  
John Merrill  
Joyce Parker
Paper 4: Understanding Undergraduate Students’ Conceptions In Science: Using Lexical Analysis Software to Analyze Students’ Constructed Responses in Biology
Rosa A. Moscarella
Mark Urban-Lurain
John Merrill
Gail Richmond
Ronald Patterson
Joyce Parker

Strand 6: Coordinator Organized Paper Set: New Ways of Researching Field Trips
Room: Laurel C

Paper 1: Building a Quality Field Trip Teacher Survey Instrument
Martin Storksdieck

Paper 2: The Impact of Multiple Visits to an Informal Learning Facility on the Development of Interest in Science
Pascal Guderian
Burkhard Priemer

Paper 3: Using Personal Meaning Mapping to Assess Learning at a Natural History Museum
Gary M. Holliday
Norman G. Lederman
Judith S. Lederman

Paper 4: Best Practices for Field Days Assessment Tool
Stephan P. Carlson
Joe Heimlich
Martin Storksdieck
Dawn Tanner

Strand 7: Symposium: Preservice K-8 Teachers’ Developing Pedagogical Context Knowledge Within an Integrated Science and Education Continuum
Room: Kent B

Presider: Danielle J. Ford

Danielle J. Ford
Steve Fifield
Xiaoyu Qian
Deborah Allen
Richard Donham
Yovita Gwelkwere

Strand 7: Coordinator Organized Paper Set: Preservice Teachers’ Perceptions of Science
Room: Kent C

Presider: John Tillotson

Paper 1: Teachers’ Classroom Attitude and Behavior and Their Effects on Students’ Science Learning
Tahsin Khalid

Paper 2: Out-Of-School Learning-To-Teach Experiences as Support for Professional Identity Development: Impact of Facilitating an Inquiry-Based Camp
Michael A. Occhino
April L. Luehmann

Paper 3: The Impact of Pre-service Program Experiences on Early-Induction and Post-Induction Science Teachers’ Epistemological Beliefs
John Tillotson
Monica J. Young

Paper 4: Future Elementary Teachers’ Epistemological Beliefs and Views about the Nature of Science
Charles B. Mamolo
N. Sanjay Rebello

Strand 8: Related Paper Set: Using the Communication in Science Inquiry Model to Facilitate Learning
Room: Dover B

Presider: Dale R. Baker

Paper 1: Using the Communication in Science Inquiry Model to Facilitate Learning Biology
Dale R. Baker
Elizabeth Lewis
Sibel Uysal
Senay Yasar-Purzer
Michael Lang
Perry Baker

Paper 2: Measuring Short-Term Teacher Learning of Scientific Classroom Discourse Communities
Elizabeth Lewis
Dale R. Baker
Senay Yasar-Purzer
Sibel Uysal
Michael Lang

Paper 3: Teachers’ Meaning-Making During Professional Development of Scientific Classroom Discourse Communities
Sibel Uysal
Senay Yasar-Purzer
Dale R. Baker
Elizabeth Lewis
Michael Lang
Paper 4: Teachers’ Progress Towards a Modernist View of Nature of Science Communication
Senay Yasar-Purzer
Sibel Uysal
Dale R. Baker
Elizabeth Lewis
Michael Lang

Strand 10: Symposium: PISA 2006: Results from an International Assessment of Scientific Literacy
Room: Essex C
Presider: Bruce G. Waldrip
Barry McCrae
Raymond J. Adams
Peter Fensham
Robert Laurie
Rodger W. Bybee
Manfred Prenzel

Strand 11: Coordinator Organized Paper Set: Implications of Identity for Science Teaching and Learning
Room: Laurel A
Presider: Angela Johnson

Matthew Weinstein

Paper 2: Learning to Teaching Science: Negotiating Identity and Discursive Conflict in the Science Classroom
Maria S. Rivera Maulucci

Paper 3: Negotiating Respect and Learning in a Middle School Science Classroom
Adriane M. Slaton
Howard M. Glasser
Angela Calabrese-Barton

Strand 12: Symposium: Learning Science Through Video Games
Room: Laurel B
Presider: Carolyn Parker
Leonard A. Annetta
Shawn Y. Holmes
James Minogue
Meng-Tzu Cheng

Strand 13: Coordinator Organized Paper Set: Historical/Contextual Perspectives on the Nature of Science
Room: Kent A
Presider: Renee S. Schwartz

Paper 1: The Nature and Role of Evidence in Addressing Controversial Science Content
Daniel Dickerson

Paper 2: The Model Muddle: The Necessity of Epistemology for Learning Science
Michael R. Matthews

Paper 3: Genetics Instruction with History of Science: Nature of Science Learning
Sun Young Kim
Irving E. Karen

Paper 4: A Dispute on Colour Optics
Helmut F. Mikelskis
Lutz Kasper

Session 3
4:15PM – 5:45PM

Committee Sponsored Session: How Can We Translate and Communicate our Science Education Research to Practice
Publications Advisory
Room: Dover A

Publications Advisory Committee
Presider: Barbara A. Crawford
Barbara A. Crawford
Carla Zembal-Saul
Sandra K. Abell
William Holliday
Julie Luft

Strand 1: Symposium: Investigating Dynamic Transfer in Multiple Contexts
Room: Essex B
Presider: Eva E. Toth
Dean Zollman
N. Sanjay Rebello
Edgar G. Corpuz
Jacquelyn J. Haynicz
Bijaya Aryal
Dyan McBride
Edward F. Redish

Strand 2: Coordinator Organized Paper Set: Building Science Identities and Student Achievement
Room: Laurel D
Presider: Anat Yarden

Sunday, March 30
**Sunday, March 30**

**Paper 1:** How Girls and Boys Use Computers in Physics Classes  
Helga Stadler

**Paper 2:** The Role of Identity and Motivation to Resolve Misconceptions  
Meena M. Balgopal

**Paper 3:** An Investigation of Factors Associated with Students’ Interest in Physics  
Hayati Seker  
Aysegul Terzi

**Paper 4:** The Effects of Different Science-Subject Achievements on Self-Concept in Science Learning - Are They Same for 8th Graders in Taiwan?  
Jen Tsung-Hau  
Lee Che-Di  
Chang Chun-Yen

**Strand 5:** Coordinator Organized Paper Set: Reasoning and Argumentation  
Room: Essex A

**Presider:** Gail Richmond

**Paper 1:** Scientific Reasoning Skills Development in an Introductory Biology Course Sequence for Undergraduates  
Melissa S. Schen

**Paper 2:** Quality and Evolution of Students’ Argumentation in Organic Agriculture Issue  
Shu-Mey Yu

**Paper 3:** Examining Students’ Scientific Arguments as a Consequence of Inquiry-Based Chemistry Experiences  
Aeran Choi  
Brian Hand  
Thomas Greenbowe

**Paper 4:** Decision Making in Higher Education: A Probe into STES-Oriented Courses  
Uri Zoller  
David Ben-Chaim  
Orit Herscovitz  
Azaiza Ibtisam

**Strand 6:** Coordinator Organized Paper Set: Learning from Underrepresented Learners in Informal Science Studies  
Room: Laurel C

**Presider:** John Falk

**Paper 1:** Gender Differences in Elementary School Students’ Environmental Education  
Sarah J. Carrier  
Anthony J. Guarino

**Paper 2:** The Impact of Free-Choice STEM Experiences on Girls’ Interest, Engagement, and Participation in Science Communities, Hobbies and Careers: Results of Phase 1  
Lynn D. Dierking  
Dale McCready

**Paper 3:** African American Parents’ Perspectives of Informal Science: A Cultural Dimension  
Jamila R. Simpson  
Eileen C. Parsons

**Paper 4:** Free-Choice Family Learning in a Bilingual Marine Science Program: A Qualitative Investigation of Interactions and Long-Term Impacts Among Mexican-Descent Families  
Heidi I. Schmoock  
Shawn Rowe

**Strand 7:** Coordinator Organized Paper Set: Approaches for Science Teacher Education I  
Room: Kent B

**Presider:** Peter W. Hewson

**Paper 1:** Does Completion of University Science Courses Affect the Spatial Ability of Preservice Elementary/Middle Teachers?  
Alice A. Black

**Paper 2:** Conceptual Change in Pre-service Teacher Belief Structures Through Japanese Lesson Study  
Brian S. Fortney  
James P. Barufaldi

**Paper 3:** Teaching Argumentation to Pre-Service Science and Technology Teachers: The Critical Thinking Group  
Peter W. Hewson  
Maureen Robinson

**Paper 4:** Investigation of Pre-service Teachers’ Reasoning Abilities and Learning Approaches in Inquiry Based Learning Environment  
Sinan Ozgelen  
Esme Hacieminoglu  
Ozgul Yilmaz-Tuzun

**Strand 7:** Coordinator Organized Paper Set: Assessing Preservice Teachers’ Knowledge  
Room: Kent C

**Presider:** Kimberly A. Staples
Paper 1: Persistent Misconceptions of Biological Concepts Among Preservice Teachers and 2nd Grade Students: The Power of Probing
Kimberly A. Staples

Paper 2: Relationship Between Environmental Literacy and Background Characteristics of Teacher-Training Students: Implications for Training Programs
Sara Peer
Daphne Goldman
Bela Yavetz

Paper 3: Investigating the Pedagogical Content Knowledge of Pre-Service Elementary Teachers Concerning Models
Susan A. Everett
Gail R. Luera
Charlotte A. Otto

Paper 4: Design and Development of an Instrument to Assess Pedagogical Content Knowledge of Inquiry Science Teaching
Betty Adams
David Schuster
William W. Cobern
Brooks Applegate
Renee S. Schwartz
Adriana Undreiu
Paul Vellom

Strand 8: Coordinator Organized Paper Set: Fostering Content Knowledge and NOS
Room: Dover B
Presider: Kefyn M. Catley

Paper 1: Explicit Nature of Science Instruction: Can It Change In-Service Teachers’ Perceptions of NOS?
Monica J. Macklin
April D. Adams

Paper 2: The Pedagogical Beliefs and Values of Physics Alternative Certification Teacher Candidates
Kathleen A. Falconer
Joseph L. Zawicki

Paper 3: Connecting Professional Development to Classroom Based Instruction
Kimberly A. Lebak
Norma Boakes

Paper 4: Using a Concept Map to Guide Instruction: The Impact on Teachers’ Understanding of Evolution
Susan Gomez-Zwiep
Shawn Y. Holmes

Strand 10: Coordinator Organized Paper Set: Curriculum Implementation I
Room: Essex C
Presider: Douglas Huffman

Paper 1: Fidelity of Implementation to Instructional Strategies as a Moderator of Science Curriculum Unit Effectiveness
Carol O’Donnell
Sharon J. Lynch

Paper 2: Middle School Science Curriculum: Coherence as a Design Principle
Yael Shwartz
Ayelet Weizman
David Fortus
Joe Krajcik
Brian J. Reiser

Paper 3: A Framework for Measuring Fidelity of Implementation of Science Instructional Materials
Jeanne R. Century
Mollie Rudnick
Cassie Freeman
Debbie Leslie
Murat Kahveci
Andy Isaacs

Paper 4: Measuring Fidelity of Implementation: Understanding “Critical Components” of Science Instructional Materials
Mollie Rudnick
Jeanne R. Century
Cassie Freeman
Debbie Leslie
Murat Kahveci
David Beer

Strand 11: Symposium: Immigration, Culture, and Science Education in New York City
Room: Laurel A
Presider: Karen E Phillips

Wesley B. Pitts
Ashraf Shady
Gillian U. Bayne
Karen E. Phillips
Kenneth G. Tobin

Strand 12: Coordinator Organized Paper Set: Technology and Students’ Conceptual Learning
Room: Laurel B
**Evening Events**

**6:00PM – 7:00PM**
Room: Dover C

**Membership and Elections Committee Sponsored Session: Mentor-Mentee Nexus**

Membership Committee
Presider: Mary M. Atwater

Brian Fortney
Laura Henriques
Julie Grady

**7:00PM – 9:00PM**

**Opening: Presidential Welcome Reception—All invited!**

Room: Harborside Ballroom

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**Paper 1: The Use of Internet-Based Instruction for the Development of Conceptions of and Approaches to Learning Science in a Physiology Class**
Jhy-Chong Liang
Chin-Chung Tsai

**Paper 2: The Application of the 3D Virtual Reality on Field Trip: Taking the Example of Hsiaoyukeng**

Ming Chao Lin
Chun-Yen Chang

**Paper 3: Promoting Middle-School Students’ Spatial Perception of the Moon Phases with a Web-Based Module**

Meytal Hans
Yael Kali
Yoav Yair

**Paper 4: Virtual World, Real Impact: Gender, Race and The Use of a 3D Virtual World to Teach Concepts Around Water Quality**

Janice L. Anderson
Cindy Jong
Mike Barnett

**Strand 13: Coordinator Organized Paper Set: Socio-cultural Studies of the Nature of Science**
Room: Kent A

Presider: Fouad Abd-El-Khalick


James B. Cooper

**Paper 2: Student Predispositions Toward Understanding Evolutionary Concepts**

Ronald S. Hermann

**Paper 3: The Applicability of Science to Decision Making: Moral & Reflective Factors**

Sharon Dotger
Lisa Johnson
Benjamin H. Dotger

**Paper 4: Scientists, Profit-driven Science, and School Science**

John Bencze
Gervase M. Bowen
Maurice DiGiuseppe
Marijana Kanisek

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Sunday, March 30
NARST Committee Meetings
7:00AM - 8:15AM

Awards Committee Chairs and Co-Chairs Meeting
Room: Essex A

Equity and Ethics Committee Meeting
Room: Laurel A

External Policy and Relations Committee Meeting
Room: Laurel B

International Committee Meeting
Room: Essex B

Membership and Election, Committee Meeting
Room: Laurel C

Program Committee Meeting
Room: Laurel D

Publications Advisory Committee Meeting
Room: Kent A

Research Committee Meeting
Room: Kent B

Ad hoc: History of Science Education Committee Meeting
Room: Kent C

Plenary Session 1
8:30AM – 9:45AM
Room: Grand Ballroom V & VI

Program Committee Sponsored Plenary 1:
Marcia Linn, Keynote Speaker: Science, Technology and Policy
Presider: Penny J. Gilmer

Session 4
10:15AM – 11:45AM

Strand 1 & Strand 9 Combined: Interactive Poster Session
Room: Laurel B
Presider: Shawn Rowe

Strand 1

Paper 1: Understanding the Relationship Between Learning and Forms of Representations by Analyzing Students’ Mental Models of Atomic Structure
Eun Jung Park

Paper 2: Representational Tools for Teaching Science: Designing a Research-Based Approach
Eva E. Toth

Paper 3: A Comparison of Visual Representations of DNA Replication
Michelle Cook
Eric N. Wiebe
Glenda Carter

Paper 4: Teaching and Learning From a Representational Perspective: Insights From a Classroom Video Study
Peter Hubber
Maria F. Haslam
Russell W. Tytler

Strand 9

Paper 1: Learning About Sound through Inquiry. A Study with 8th Grade Pupils
Monica L. Baptista
Ana M. Freire

Paper 2: Improving Our Practice: Teachers’ Stories about Supported Collaborative Inquiry
Tamara D. H. Nelson
Keith Johnson
Charlotte Waters
Linda Lebard

Paper 3: Investigating Students’ Ideas About Wavefront Aberrometry
Dyan McBride
Dean A. Zollman

Paper 4: Student Preconceptions of the Role of Pollination in the Plant Life Cycle
Stephen M. Rybczynski
Elisabeth E. Schussler
Paper 5: Christopher Columbus Discovers... Magnetic Declination Changes! Improving Metaconceptual Knowledge with Learning About Change of Models and Historical Mistakes in Science
Lutz Kasper
Helmut F. Mikelskis

Paper 6: Understanding Middle School Students’ Views of the Nature of Science: Perspectives from a Seventh Grade Classroom
Jamie M. Chan
Kimberly D. Tanner

Paper 7: Understanding Novices’ Versus Experts’ Conceptions About the Biological Basis of Learning and Memory
Rebecca M. Fulop
Kimberly D. Tanner

Paper 8: A Longitudinal Study of Elementary Students’ Understandings of Lunar Concepts Related to Moon Phases
Mark Guy
Tim Young

Paper 9: Learning to Think about Gravity II: Aristotle, Newton, and Einstein
Esther L. Zirbel
Claudine I. Kavanagh
Cary Sneider

Paper 10: Investigating the Relationship Between Students’ Motivation and Concept Learning in a Digital Learning Context
Chung-Hsien Tseng
Hsiao-Lin Tuan
Chi-Chin Chin

Paper 11: Relationship Between Students’ General and Theory-Specific Beliefs on the Nature of Science
Kerstin Kremer
Detlef Urhahne
Juergen Mayer

Paper 12: An Examination of Fifth- to Eighth-Grade Students’ Understandings About Inquiry and Doing Inquiry
Eunkyung Ko
Byoung-Sug Kim
Norman G. Lederman

Paper 13: Cross-Cultural Analysis of Knowledge Structure Coherence and Understanding of Force
Douglas Clark
Sharon Schleigh
Cynthia Dangelo
Gokhan Ozdemir
Helen Zhang
Edgar Corpuz

Strand 2: Interactive Poster Session--Theorizing and Modeling Inquiry
Room: Grand Ballroom Salon 1
Presider: Christopher Emdin

Paper 1: High School Students’ Understanding of the Distinction Between Scientific Theories and Scientific Laws
Eun Ah Lee
Byeong-Geon Park

Paper 2: “Maybe The Algae Was From The Filter”: Theorizing ‘Maybe’ And Its Use By Young Children In Conversation
Susan A. Kirch
Christina Siry

Paper 3: Science as Argument-Driven Inquiry: The Impact on Students’ Conceptions of NOS
Victor D. Sampson
Jonathon Grooms

Paper 4: Learning to Think Like Scientists with the PET Curriculum
Valerie K. Otero
Kara Gray

Paper 5: Elements of Online Inquiry: Integrating Inquiry With Content in an Online Chemistry Course for Teachers
Mary V. Mawn
Kathleen S. Davis

Paper 6: The Comparison of Scientific Creativity Levels Between Students and Teachers
Anne Laius
Miia Rannikmäe

Paper 7: The Planetarium as an Outdoor Learning Environment
Ayelet Weizman
Nir Orion

Paper 8: A Discourse-Based Analysis of Student Inquiry in Elementary Science Classroom: Examining Students’ Mechanistic Reasoning, Analogical Reasoning, Argumentation and Scientific explanations
Loucas T. Louca
Zacharias C. Zacharia
Aristos Evagorou

Paper 9: The Influence of Prior Knowledge and Cognitive Load Theory on Instructional Design Principles
Michelle Cook
Glenda Carter
Eric N. Wiebe
Paper 10: Sixth Graders’ Approaches to Maps and Mapping
Angelica Reid-Griffin
Glenda Carter
Eric N. Wiebe
John Park
Susan Butler

Strand 3: Interactive Poster Session--Science Teaching at Primary School
Room: Laurel A
Presider: Valerie L. Talsma

Paper 1: Elementary School Teachers’ Learning of Science Content Through Teaching
Brian E. Kinghorn

Paper 2: Revisiting Elementary Teachers’ Physical Science Conceptions After the No Child Left Behind Act
Nazan U. Bautista

Paper 3: Improving the Argumentation Skills of the Sixth Graders Through the Instruction of the Socioscientific Issues in Taiwan
Shu-Sheng Lin
Po-Hung Huang

Paper 4: Inquiry and Astronomy: Investigations in Celestial Motion
Julia D. Plummer
Rebecca Rice

Paper 5: Unpacking Sixth Grade Students’ Mental Models of Popular Astronomy Concepts
Dorian W. Janney
William Holliday

Paper 6: Infusing Guided TAPing with a Socioscientific Issue in Science Teaching
Chi-Chin Chin
Wei-Cheng Yang
Hsiao-Lin Tuan

Paper 7: On the Nature of Teaching Nature of Science: Preservice Early Childhood Teachers’ Instruction in Preschool and Elementary Settings
Valarie L. Akerson
Cary A. Buzzelli
Lisa A. Donnelly

Paper 8: Patterns in the Science Knowledge of Elementary Preservice Teachers Engaged in Inquiry Teaching
Betty J. Young
Barbara Sullivan Watts
Robert Pockalny
Barbara L. Nowicki

Paper 9: Puppets Promoting Reasoning and Argument Science
Shirley Simon
Stuart Naylor
Brenda Keogh
Jane Maloney
Brigid Downing

Strand 4: Interactive Poster Session--Teaching Strategies, Assessment, and Technology
Room: Dover A
Presider: Melissa Luna

Paper 1: Developing Assessments of Science Content Knowledge for Teaching
Mark Olson

Paper 2: Suggestion of a New Strategy to Teach Evolution
Minsu Ha
Heeyoung Cha

Paper 3: A Comparison of the Teaching Strategies for Problem Solving in Senior High School Physics
Jang-Jeng Chern
Ming-Jun Su
Ming-Liang Lin
Shing-Ho Chiung

Paper 4: Integrating FAM-WATA into Elementary School Natural Science and Technology Education: Analyzing the Benefits for Students with Different Cognitive Styles
Chao Li Ling
Tang Xing Juan
Yen Chiung Fen
Wang Tzu Hua
Wang Wei Lung

Paper 5: The Effect of Reflective Discussions Following Inquiry-Based Laboratory Activities on Students’ Views of Nature of Science
Hagop Yacoubian
Saouma B. BouJaoude

Strand 5: Interactive Poster Session--College Science Teaching and Learning
Room: Essex B
Presider: Peter Garik

Paper 1: Misconceptions University Students Have in Astronomy
Hyunjoo Lee
Paper 2: Argumentation for the Future
Emily J. Diefendorf
Gregory J. Kelly

Paper 3: Does Computer-Based Animation Sequence Impact Student Understanding of the Model of Global Atmospheric Circulation?
Daniel W. Harris
William Holliday

Paper 4: Immediate Feedback From Videotaping to Increase Science Process Skills in General Chemistry Lab
Dawne Taylor
Amy L. Rogers

Paper 5: Influences on Undergraduate Physical Science Learners’ Subject Decision Making
Len R. Newton
Andy Noyes
Andy Clapham

Paper 6: Biology Students’ Ideas about Germs and Illness: An Exploratory Study of Conceptual Change
Cheryl Berg
Stephanie Touchman
Muhsin Menekse

Paper 7: Exploring the Relationships Between Epistemic Beliefs and Nature of Science in a College Biology Course
Moon-Heum Cho
Deanna M. Lankford
Daniel J. Wescott
Deborah Cunningham

Paper 8: Undergraduate Learning at the Interface of Mathematics and Biology
Cynthia Passmore
Julia Svoboda
Carole Hom
Grosberg Rick

Paper 9: Effects of Embedding Nature of Science Concepts in a College Level Physical Science Course
Lisa M. Martin-Hansen
John Wilson
Joseph Placanica
Robert Gable

Paper 10: Visual Physics: Using a Case Correlation Study to Inform Introductory Physics Course Design
Cathy M. Ezrailson
Cathleen C. Loving
Peter L. McIntyre
Teruki Kamon

Strand 6: Interactive Poster Session—Beyond the Museum’s Walls: Informal Science Across Contexts
Room: Kent B

Presider: Shawn Rowe

Paper 1: Understanding Science (Fairs) in the News Media
G. Michael Bowen
J. Lawrence Bencze
Elizabeth Sampson

Paper 2: Evidence-based Explanation of High School Students in Natural History Museum
JooHye Jung

Paper 3: A Review of Measures of Student Concept Learning From Field trips to Informal Science Institutions
William A. Watson

Paper 4: Enhancing Science Understanding for Middle School Students Through Interactions With a Field Botanist
Debby Peck
Karen S. Sullenger

Paper 5: 21st Century Community Learning Science Education Camp
Andre M. Green
Phillip Feldman

Paper 6: Responses to Traveling Do-It-Yourself Science Exhibits in Community Settings
Leonie Rennie
Rosemary S. Evans
Fiona E. Mayne

Paper 7: Informal Settings for Learning and Achievement: Museums in Action
Sandra T. Martell
Elizabeth Drame
Raquel Oxford

Paper 8: A Cultural-Historical Activity Theory Perspective on Science Outreach Programs
Nicole Arsenault
G. Michael Bowen
J. Lawrence Bencze
Bradley Tucker

Paper 9: Involving Elementary Teachers in Informal Learning Experiences
Nicholas Stroud
Megan Roberts
Jenny Ingber
Katherine Brown
Strand 7: Interactive Poster Session--Preservice Science Teacher Education
Room: Grand Ballroom Salon II

Presider: Meredith Park Rogers

Paper 1: Learning and Teaching Science as Inquiry
Hui-Ju Huang

Paper 2: Investigating “Life in a Square”: An Examination of Elementary Preservice Teachers’ Understanding of Observation and Inference
Meredith Park Rogers

Paper 3: Contributions of the Mentor Teacher: Opportunities for Pre-service Science Teacher Learning During the Methods Semester
Karen A. Travers
Christopher J. Harris

Paper 4: Navigating the Bottleneck of Curriculum Planning: Exploring the Struggles in Planning the Pre-service Elementary Science Method Course
Hedy Moscovici
Irene Osisioma

Paper 5: Validation of Mentoring for Effective Primary Science Teaching Instrument for a Turkish Sample
Ozgul Yilmaz-Tuzun
Nurcan Turker

Paper 6: Teacher-in-Residence Programs: Supporting Physics Teacher Education at the University and Beyond
Marcia K. Fetters
Paul Hickman

Paper 7: Giving Priority to Evidence in Science …..and History? How Preservice Elementary Teachers Make Sense of Evidence in Science and Social Studies Methods Courses
Leigh A. Haefner
Timothy D. Slekar

Paper 8: Learning Physics by Listening to Children
Danielle B. Harlow
Valerie K. Otero

Paper 9: Preparing Secondary Science Teachers at the University of Arizona
Ingrid Novodvorsky
Vicente Talanquer
Debra Tomanek

Paper 10: BEST Model of Professional Development: Helping Science Intern Teachers to Meet the Needs at the Front Line
Ming-Liang Lin
Ming-Jun Su
Jeng-Fung Hung

Paper 11: Constructivist and Traditional Approaches to Teaching and Learning: Validation of Teacher Beliefs Survey
Bugrahan Yalvac
Nurcan Turker
Ozgul Yilmaz-Tuzun

Strand 8: Interactive Poster Session--Facets and Issues of Professional Development
Room: Grand Ballroom Salon IV

Presider: Carla Johnson

Abdulkadir Demir
Sandra K. Abell

Paper 2: Does Change From Professional Development Programs Last? A Longitudinal Study of Sustained and Increased Science Teacher Improvement
Carla Johnson
Jane B. Kahle
Jamison D. Fargo

Paper 3: Community Advisory Panels in American Indian School Communities
Rebecca M. Monhardt
Vessela K. Ilieva
James Barta
Kurt Becker

Paper 4: Subject Mentors: Professional Development in a School-Based Mentor Training Program
Tung-Hsing Hsiung
Wen-Hua Chang
Chao-Ti Hsiung
Ricy Chang

Paper 5: Teachers’ Burning Questions: Understanding Challenges That Science Teachers Face and Problem-Based Learning as a Framework to Support Teacher Researcher
Meilan Zhang
Tom J. McConnell
Mary Lundeberg
Matthew J. Koehler
Jan Eberhardt

Paper 6: The Impact of Teaching the Conceptual History of Physics as a Sequence of Models on the Understanding of the Nature of Science by Physics Teachers
Charles Winrich
Andrew Duffy
Arthur Eisenkraft
Russ Faux
Luciana Garbayo
Peter Garik
Paper 7: Building a Continuum of Practice: First Year Secondary Science Teachers
Julie Luft
Gillian H. Roehrig
Krista Adams
Selcen Guskey
Sarah Hick
Jonah Firestone

Strand 10: Interactive Poster Session-Curriculum, Evaluation, and Assessment
Room: Dover C
Presider: Kimberly D. Tanner

Paper 1: Plant Versus Animal Content in Elementary Science Textbooks
Elisabeth E. Schussler

Paper 2: Intended, Taught and Learned Curriculum: Student Learning Through a Problem-Based Environmental Health Science Curriculum
Nam-Hwa Kang

Paper 3: Tracking Students' Process of Learning
Dorita A. Demetriou
Constantinos Korfiatis

Paper 4: Collaborative Evaluation Communities in Urban Schools: Developing the Capacity of Teachers to Evaluate Science Programs
Dana Atwood
Douglas Huffman

Paper 5: Probing Middle School Students' Understanding of Ideas About Interdependence in Living Systems through Content-Aligned Assessment
Kristen A. Lennon
George DeBoer

Paper 6: Probing Middle School Students' Understanding of Ideas about Matter Transformations in Living Systems Through Content-Aligned Assessment
Natalie S. Dubois
George DeBoer

Paper 7: Developing a Two-Tiered Instrument with Confidence Levels for Assessing Students' Conceptions of Direct Current Circuits
Saed Sabah
Xiufeng Liu

Paper 8: The Nature of Scientific Thinking: Assessing How Students Respond to Lessons Designed to Develop Understanding of the Nature of Science and Modeling
Amanda Hefner-Wong
Tina Grotzer
Lucy Morris

Paper 9: Scaffolded Inquiry Curriculum for Science Learning
Ying-Shao Hsu
Fang-Ying Yang
Meng-Jung Tsai

Paper 10: Preliminary Use of an Assessment for Scientific Inquiry Creativity
Michelle R. McCombs
Marco Molinaro
Ken Peterson
Richard Ponzio

Paper 11: Innovating Science Curricular Materials for Future Citizenship-3C-AIMS Project
Yeong-Jing Cheng
Ying-Shao Hsu
Wen-Hua Chang
Tsung-Hau Jen
Shu-Fen Lin
Che-Di Lee

Strand 11: Interactive Poster Session--Diverse Learners and Teachers in Science Education
Room: Laurel C
Presider: Bhaskar Upadhyay

Paper 1: Student Voice Matters: Using Student Feedback to Evaluate Curriculum in an After School Science Program
Janell N. Catlin

Paper 2: Dynamics of Successful Student Kinship Groups in a College Physics Class of Inner City High School Students
Konstantinos Alexakos

Rommel J. Miranda

Paper 4: An Analysis of the Association of Gender and Ethnicity with Departure from the Biology Major
Sarah A. Lang

Paper 5: Exploring Pakistani High School Student Understanding of Evolution
Anila Asghar
Jason Wiles
Brian Alters
Paper 6: Theory to Practice – Challenges and Successes 
Implementing an Inquiry-Based Science Curriculum with 
Diverse Learners and Its Impacts on Student Learning and 
Engagement 
Sybil S. Kelley
William G. Becker 
Dalton Miller-Jones

Strand 11: Interactive Poster Session--Science Careers and 
Identity Issues in Science Education
Room: Essex A
Presider: Felicia M. Moore

Paper 1: The Motivation and Perseverance of Women Sci-
ence Students of Color 
Angela Johnson

Paper 2: Negotiating Pathways to Successful Science Careers: 
The Life Experiences of African-American Women 
Claudette Giscombe

Paper 3: Positioning in the World of Science: A Look at Four 
Youths’ Hybrid Identity Work Within and Beyond a Math 
and Science Upward Bound Program 
Jrene Rahm

Paper 4: Teachers’ Self-Identity and Conceptual Hurdles to 
“Science For All” 
Alejandro Gallard 
Sherry A. Souttherland

Paper 5: Women in Undergraduate Physics, Chemistry, 
Mathematics, and Computer Science: How Can We Sustain 
Them Through Graduation? 
Barbara A. Burke 
Dennis W. Sunal 
Glenda Ogletree

Paper 6: Science Teachers’ Conflicts and Practices in Rela-
tionship Between Science and Religion: A Life-Historical 
Approach to Two Realms 
Hunkoo Jho 
Miran Chun 
Jinwoong Song

Paper 7: A Look at Meaning-Making Inside Partnership 
Projects Among Scientists, Museums and Schools: Struggles, 
Confusions or Cocreations? 
Jrene Rahm

Strand 12: Interactive Poster Session--Technology in Science 
Classrooms
Room: Kent A
Presider: Christine G. Schnittka

Paper 1: Using Educational Computer and Video Games in 
K-12 Classrooms to Promote Learning: A Critical Literature 
Review 
Janice L. Anderson

Paper 2: Multimedia Learning in a Real Classroom 
Nathan Wood

Paper 3: Investigating the Use of ThinkerTools to Promote 
Learning of Newton’s Laws of Motion - A Case Study 
Han-Chin Liu 
Hsueh-Hua Chuang

Paper 4: Interactive Whiteboards: Beginning a Study on 
Their Impact in a Wholly Wireless / Laptop Classroom 
Environment 
Lyn C. Carter 
Philip C. Clarkson

Paper 5: Engineering in Health Care: A Multimedia Cur-
riculum for Secondary Science Teachers 
Carolyn Parker 
Taryn M. Bayles 
Julia Ross

Strand 13: Interactive Poster Session--History, Philosophy, 
and Sociology of Science
Room: Essex C
Presider: Valarie L. Akerson

Paper 1: Research and Development of Nature of Science-Ex-
plicit Curricular Materials- Pedagogy Perspective 
Sang-Chong Lieu 
Wen-Ling Chen 
Sufen Chen 
Shu-Fen Lin 
Mao-Tsai Huang 
Tung-Hsing Hsiung

Paper 2: Research and Development of Nature of Science-Ex-
plicit Curricular Materials for the Dissolving Unit 
Sufen Chen 
Wen-Ling Chen 
Shu-Fen Lin 
Sang-Chong Lieu 
Wen-Hua Chang
**Strand 14: Interactive Poster Session--Environmental Issues**  
Room: Laurel D

**Presider:** Rita Anne Hagevik

**Paper 1:** Students' Post-Ecological Discourse in a Secondary One SETS (Science-Technology-Society-Environment) Education  
Albert Zeyer

**Paper 2:** Earth and Environmental Science Textbooks' Coverage of Secondary Students' Concepts of Global Warming  
Soyoung Choi  
Dan P. Shepardson  
Dev Niyogi  
Umaporn Charusombat

**Paper 3:** Precipitation, Evaporation, and Condensation: Student Conceptions of the Hydrologic Cycle  
Daniel P. Shepardson

**Paper 4:** High School Students' and Science Teachers' Knowledge of the Socioscientific Controversies on Global Climate Change  
Virginie Albe

**Paper 5:** Children's Ideas About Rare and Threatened Species: Implications for Teaching  
Demetra P. Hadjichambis  
Konstantinos Korhatis  
Andreas Ch Hadjichambis

**Paper 6:** Rhetorical Analysis of Global Warming and Other Socioscientific Issues in Popular News Media  
Daniel Dickerson  
Craig Stewart  
Rose Hotchkiss  
Daniel Cutshaw  
Julie Lambert

**NARST Business Meeting**  
Room: Grand Ballroom V &VI  
12:00PM – 12:45PM  
Free box lunch for attendees who have registered for this event

**Session 5**  
1:00PM – 2:30PM

**Committee Sponsored Workshop: IESDOE Workshop: Preparing Research Grant Proposals for the Institute of Education Sciences**  
Room: Dover A

**Presider:** Elizabeth Albro

**Strand 1: Related Paper Set: Representation and Learning in Science: Exploring Recent Perspectives from Cognitive Science**  
Room: Essex B

**Presider:** Eva E. Toth
Paper 1: Representation and Learning in Science: Exploring Recent Perspectives from Cognitive Science
Vaughan Prain
Russell W. Tytler
Peter Hubber

Paper 2: Examining the Impact of Student Use of Multiple-Mode Representations on Argument Construction
Brian Hand
Aeran Choi
Thomas Greenbowe
Jacob Schroeder
William Bennett

Bruce G. Waldrip
Vaughan Prain
James Carolan

Paper 4: Pacific Crystal Project: Explicit Literacy Instruction Embedded in Middle School Science Classrooms
Robert Anthony
Christine Tippett
Larry Yore

Strand 1: Coordinator Organized Paper Set: Naive Beliefs and Mental Models
Room: Laurel C
Presider: Anat Yarden

Paper 1: On Constraints and Learning Progressions: The Case of “Structure of Matter”
Vicente Talanquer

Paper 2: The Challenges Ahead for Research and Development on Conceptual Change in Science
Reinders Duit
David Treagust

Paper 3: A Learning Progression for Apparent Celestial Motion
Julia D. Plummer
Joe Krajcik

Paper 4: Investigating the Influences of Mental and Model Based Teaching-Learning Sequences on Students’ Learning in Electricity
Jing-Wen Lin
Mei-Hung Chiu

Strand 2: Coordinator Organized Paper Set: Tutoring and Peer Guided Interactions in Science Education
Room: Grand Ballroom Salon IV
Presider: Gillian U. Bayne

Paper 1: Science for All and Inclusion: Learning From Dion
Michele Hollingsworth Koomen

Paper 2: Metacognition and Affect in the Language of Chemistry Tutors
Karen E. Phillips
Mya Marquis

Paper 3: Learning From Young Experts. A Study of the Interplay Between Students and Young Experts in a Biology Lab
Jesús Piqueras
Nadia Seneby
Karim M. Hamza

Paper 4: What Are They Talking About? Lessons Learned From a Study of Peer Instruction Discourse
Mark James
Federica Barbieri
Paula Garcia

Strand 2: Coordinator Organized Paper Set: Investigating Teacher Epistemologies and Practices
Room: Laurel D
Presider: Ann Rivet

Paper 1: Student Learning in Problem-based Inquiry: From the Perspectives of Teachers
Nam-Hwa Kang
Daniel Balls

Paper 2: Using Preschool Science Activities to Impact Teaching Interactions and Learning Environments
Liesel Copeland
Kathleen C. Haynie

Paper 3: An Analysis of Teachers’ Scientific Epistemological Views and Reactions to Incidents with Misconceptions
Harika Ozge Arslan
Aylin Cam
Ceyhan Cigdemoglu
Omer Geban

Strand 4: Related Paper Set: Identifying Different Levels of Strategies in Model-Based Instruction
Room: Dover C
Presider: John Clement

Paper 1: Six Strategy Levels for Model Based Teaching
John Clement

Paper 2: Determining Effective Target Concepts and Learning Pathways
Mary Anne Rea-Ramirez
Paper 3: Anchoring Student Reasoning in Prior Knowledge: Characteristics of Anchoring Cases in a Curriculum
A. Lynn Stephens
John Clement

Paper 4: Co-Constructing Explanatory Mental Models in High School Physics: Comparing Ratios of Teacher/Student Participation
E. Grant Williams
John Clement

Strand 4: Coordinator Organized Paper Set: Partnerships in Science Education
Room: Kent A

Presider: Angelica Reid-Griffin

Paper 1: Investigating the Short-Term and Longitudinal Impact of Scientist-Teacher Partnerships on Middle and High School Science Teachers
Loretta A. Kelley
Kimberly D. Tanner
Allison Busch

Paper 2: Examining the Role of Teacher Partnerships in Science Education Research, Professional Development, and Teacher Learning
Keisha Varma
Marcia Linn
Freda Husic

Paper 3: The Influence of Service Learning in High School Science on Undergraduate Majors
Vanessa L. Wyss
Christine Liu
Robert H. Tai

Strand 5: Coordinator Organized Paper Set: Life Sciences Methods of Instruction
Room: Essex A

Presider: Leslie Sandra Jones

Paper 1: A Matter of Concern: Marginalizing the Voice of Reason(ing) in College Science Teaching
Brett Merritt

Paper 2: An Interaction Analysis of College Biology Laboratory Students’ Discussion Board Contributions
James H. Wandersee
William Holliday

Paper 3: Cogenerative Dialogue: Improving Undergraduate Biochemistry Teaching and Learning
Penny J. Gilmer
Mohammed Al-humiari
Donald D. Bratton

Paper 4: Math Bench Biology Modules: Web-Based Math for All Biology Undergraduates
Karen C. Nelson
Gili Marbach-Ad
Katerina V. Thompson
Patricia Shields

Paper 5: Planning and Teaching in Culturally Responsive Ways: Elementary Preservice Teachers’ Integration of Multicultural Themes and Goals in Science Curriculum
Felicia M. Moore

Strand 7: Related Paper Set: Preservice Elementary Teachers and Curriculum Materials
Room: Kent B

Presider: Cynthia Passmore
Discussant: Carla Zembal-Saul

Paper 1: Pre-Service Elementary Teachers’ Appropriation of an Instructional Planning Framework
Jennifer Cartier
Wendy M. Sink
Priya Kannan
Jeanetta L. Kochhar

Paper 2: Preservice Elementary Teachers Learning to Use Science Curriculum Materials
Kristin Gunckel

Paper 3: Supporting Preservice Elementary Teachers’ Critique and Adaptation of Science Curriculum Materials Using Two Types of Educative Supports
Carrie Beyer
Elizabeth Davis

Paper 4: Facilitating Preservice Teachers’ Development of Professional Practice Through a Boundary Spanning Activity
Beth A. Covitt
Christina Schwarz
Minjung Bae
Jamie Mikeska

Paper 5: Planning and Teaching in Culturally Responsive Ways: Elementary Preservice Teachers’ Integration of Multicultural Themes and Goals in Science Curriculum
Felicia M. Moore

Strand 8: Symposium: Elementary Teachers Learning Science Content through Video Analysis of Practice: Impact of the StELLA Program on Teacher and Student Learning
Room: Dover B

Presider: Kathy Roth

Nicole Wickler
Meike Lemmens
Kathy Roth
Kathleen Schwille
Catherine Chen
Sharon J. Lynch
Strand 8: Coordinator Organized Paper Set: Action Research as a Model of Teacher Professional Development
Room: Kent C

Presider: David Kanter

*Paper 1: Generating “Knowledge of Practice” in the Context of Science Education: Case Studies in Teacher Learning*
Karen C. Goodnough

Katherine Bellomo

*Paper 3: Action Research and Support Groups - An Induction Framework for Novice STEM Teachers*
Miri Barak
Shulamit Witenoff
Judy Dori

*Paper 4: Science Teacher Education in Place: A Participatory Action Research Approach*
Anne Fiona White
Sheliza Ibrahim
Steve Alsop

Strand 10: Coordinator Organized Paper Set: Curriculum Implementation II
Room: Essex C

Presider: Mollie Rudnick

*Paper 1: The Impact of State Testing Under NCLB on Elementary Science Curriculum*
Chris L. Miller

*Paper 2: What Influence Does Regularly Using a Hands-On Science Curriculum Have on State Standardized Science Test Scores?*
Scott A. Ashmann

*Paper 3: Creating Tightly Aligned Assessments That Measure Student Growth in Primary Science in the Realities of an Urban School District*
Sanlyn R. Buxner
Christopher J. Harris
Bruce Johnson

Strand 10: Coordinator Organized Paper Set: Assessment Development IV
Room: Grand Ballroom Salon 1

Presider: Barbara A. Crawford

*Paper 1: Impact of Portfolio Assessment on Student Learning in Physics*
Feral Oğan-Bekiroglu
Abdulkadir Gunay

*Paper 2: A Computer-Based Instrument to Assess Understanding of the Concept of a Substance: Evidence from Rasch Analysis for Unidimensionality*
Philip Johnson
Peter B. Tymms
Shaun P. Roberts

Room: Laurel A

Presider: Leah A. Bricker
Discussant: Richard Duschl

Philip Bell
Leah A. Bricker
Suzanne Reeve
Carrie Tzou
Heather Zimmerman
Richard A. Duschl

*Paper 1: Developing Meanings for Science: Understanding How and When Children Consider Their Everyday Practices to be Related to Science*

*Paper 2: The Meanings Young People Attribute to the Word “Evidence”*

*Paper 3: How Everyday Activities Influence Children’s Ideas About Health*

*Paper 4: Micros and Me: Applying Ethnographic Data to the Design of a Personally Consequential Science and Health Curriculum*

Strand 12: Coordinator Organized Paper Set: Students’ Perceptions and Attitudes towards Technologies
Room: Laurel B

Presider: Leonard A. Annetta

*Paper 1: The Impact of Student Self-Efficacy on Scientific Inquiry Skills*
Diane Jass Ketelhut

*Paper 2: Students’ Perceptions of the World Wide Web as a Research Tool in Science Learning*
Hanna Kim
Paper 3: A Comparison of Self-Directed Learning in a Virtual World Environment to Traditional Science Teaching Methods
Catherine I. Norton
Margaret D. Corbit
Luis Ormaechea

Paper 4: Developing an Instrument to Assess Students’ Online Information Anxiety in Inquiry-Based Science Learning
Meng-Jung Tsai
Chien Chou
Ying-Shao Hsu
Fang-Ying Yang

Strand 14: Coordinator Organized Paper Set: Integrating Environmental and Teacher Education
Room: Grand Ballroom Salon II
Presider: Eleanor D. Abrams

Paper 1: Na Pua O Maunalua: Transdisciplinary Literacies and Multiple Identities
Pauline W. Chinn

Paper 2: How Do People Make Decisions on Local Environmental Issues? Investigating Reasoning Modes of Elementary School Teachers in Taiwan
Chuan-Shun Lin
Shiang-Yao Liu

Paper 3: Environmental Education Professional Development Programs: Characteristics that Bring Positive Impacts
Toni Sondergeld
Charles Rop
Andrea Milner

Paper 4: Environmental Knowledge: What It Tells to Create Environmental Learning of Pre-Service Teachers in Turkey
Gaye Teksoz Tuncer
Ceren Tekkaya
Semra Sungur
Jale Cakiroglu
Hamide Ertepinar

Break
2:30PM – 3:00PM

Session 6
3:00PM – 4:30PM

Program Committee Sponsored Workshop: Research on K-12 Science and Math Education at the National Science Foundation
Room: Dover A

Presider: Julia Clark
Joan Ferrini-Mundy
Julia V. Clark
David Hanchey
Sharon Locke
Larry Suter

Strand 1: Coordinator Organized Paper Set: Scaffolding Learning
Room: Laurel C
Presider: Gail Jones

Paper 1: Developing Students’ Metacognition Through Re-aligning Their Views of the Nature of Chemistry Learning: An Activity Theory Perspective
Gregory P. Thomas

Paper 2: Progression in Grade 11 Students’ Conceptions About the Aspects of the Particle Theory
Emine Adadan
Kathy C. Trundle
Karen E. Irving

Paper 3: Crossroads of Science and Mathematics: The Intersection of Scale and Proportional Reasoning
Amy Taylor

Paper 4: Impact of the Science Writing Heuristic as a Tool for Learning in Introductory Physics Laboratory
Mehmet Erkol
Brian Hand

Strand 1: Coordinator Organized Paper Set: Mixed Methods Studies of Conceptual Change
Room: Essex B
Presider: Catherine Milne

Paper 1: The Role of Content Knowledge in General Chemistry Students’ Understanding About Molecular Polarity
Chia-Yu Wang
Lloyd H. Barrow

Paper 2: Scaffolding Activities to Facilitate Student Modeling of Microscopic Friction
Edgar G. Corpuz
N. Sanjay Rebello
Ying-Tien Wu
Chin-Chung Tsai
Chun-Yen Chang

Paper 4: Writing for Learning Science: What Cognitive Tools Can Do to Structure Online Writing of Biostories
Stephen M. Ritchie
Donna L. Rigano
Louisa Tomas
Andy Yeh

Strand 1: New Poster Symposium: Learning Progressions for Environmental Science Literacy (Cross-Listed in Strand 14)
Room: Grand Ballroom Salon II
Presider: Julie Lambert and Charles Anderson
Discussants: Joseph Krajcik and Richard Duschl

Paper 1: Comparing Palestinian and American Students' Accounts of Water in Environmental Systems
Hasan Abdel-Kareem
Charles W. Anderson

Paper 2: Developing a Learning Progression for Energy in Environmental Systems
Hui Jin
Charles W. Anderson

Paper 3: Developing a K-12 Learning Progression for Carbon Cycling in Socio-Ecological Systems
Jing Chen
Lindsey Mohan
Charles W. Anderson

Paper 4: Developing a Learning Progression for Environmental Science Citizenship
Blakely K. Tsurusaki
Beth A. Covitt
Edna Tan
Charles W. Anderson

Paper 5: Developing Progress Variables for the Carbon Cycle
Karen Draney
Jinnie Choi
Yong-Sang Lee
Mark Wilson

Paper 6: Learning Progressions for Environmental Science Literacy
Kristin Gunckel
Blakely K. Tsurusaki
Karen Draney

Paper 7: The Development of a K-12 Learning Progression for Biodiversity in Environmental Systems
Josie Zesaguli
Blakely K. Tsurusaki
Brook Wilke
Charles W. Anderson
Christopher D. Wilson

Paper 8: A Learning Progression for Processes that Move Water through Socio-Ecological Systems
Kristin Gunckel
Beth A. Covitt
Hasan Abdel-Kareem
Charles W. Anderson
Rebecca Dudek

Paper 9: A Learning Progression for Processes that Alter Water Quality in Socio-Ecological Systems
Beth A. Covitt
Kristin Gunckel
Hasan Abdel-Kareem
Charles W. Anderson
Rebecca Dudek

Strand 2: Coordinator Organized Paper Set: Exploring Learning Experiences and Achievement in Science Education
Room: Grand Ballroom Salon IV
Presider: Shari L. Brittner

Paper 1: Enabling Constraints: How Physics Olympics Competitions Can Create Meaningful Learning Experiences
Rachel F. Moll

Paper 2: How Do Misconceptions of Electrochemistry Identified in Interviews Enter Into Students' Reasoning in a More Authentic Setting?
Karim M. Hamza
Per-Olof Wickman

Paper 3: Context-Oriented Learning and Its Effects on Students' Achievement Levels in Chemistry Education
Sabine Fechner
Marion Haugwitz
Angela Sandmann
Elke Sumfleth

Paper 4: Content Linkage and Cumulative Learning in Chemistry and Physics
Knut Neumann
Anna Lau
Hans E. Fischer
Elke Sumfleth
Strand 2: Coordinator Organized Paper Set: Science Discourse and Argumentation
Room: Laurel D

Presider: Brandon Emig

Samson M. Nashon
David Anderson

Paper 2: Differences in the Ways More and Less Successful Groups Engage in Argumentation: A Case Study
Victor D. Sampson
Douglas Clark

Paper 3: The Nature of Student Discourse During the Generation of Argument
Andy R. Cavagnetto
Brian Hand
Lori Norton-Meier

Paper 4: Argumentation and Scientific Reasoning - An Exploration of Their Interrelationship
Claudia von Aufschnaiter
Christian Rogge
Jan Fleischhauer
Tanja Riemerter

Strand 3: Symposium: Effects of Scaffolded Guided Instruction on Student Achievement in Elementary Science
Room: Grand Ballroom Salon 1

Presider: Kathryn S. Weisbaum

Rick Vanosdall
Michael Klentschy
Laurie Thompson
Kathryn S. Weisbaum
Larry V. Hedges

Strand 4: Related Paper Set: Large Scale Quality Development Projects in Science Education
Room: Dover C

Presider: Thomas Koballa

Paper 1: Systematic Reform of Science and Mathematics Education: Results from a Decade of Collaborative Efforts in Ohio
Michael E. Beeth
Terry L. McCollum

Paper 2: Raising the Quality of Science Teaching in Austria - The Project IMST2
Helga Stadler
Konrad Krainer
Helmut Khnelt

Paper 3: School Innovation in Science: A Viable Model for System Change?
Russell W. Tyrler

Paper 4: Improving Science and Mathematics Instruction – The SINUS-Project as an Example for Reform as Teacher Professional Development
Christian Ostermeier
Manfred Prenzel
Reinders Duit

Strand 5: Coordinator Organized Paper Set: STEM Recruitment and Course Reform
Room: Essex A

Presider: Bruce Patton

Paper 1: College Science Instructors’ Views and Experiences of Curriculum Reform
Hsiu-Ling Chen
Sufen Chen

Paper 2: Examining the Impact of Critical Events on the Decisions of Science Undergraduates to Pursue Careers as Research Scientists
Tina M. Roberts
Marcelle A. Siegel
Linda Blockus
Sandra K. Abell

Paper 3: Attracting Undeclared College Students into STEM Majors Through Their Immersion into a Scientific Community of Practice
Stephen R. Hale
Eleanor D. Abrams
Karen Graham
Barrett N. Rock

Paper 4: Impact of Undergraduate Science Course Reform on Student Outcomes
Dennis W. Sunal
Cynthia Sunal
Cheryl L. Mason
Dean A. Zollman
Corinne Lardy
Erika Steele
Strand 7: Symposium: Introducing Coteaching as an Important Element of Science Teacher Education
Room: Kent B
Presider: Colette Murphy
Colette Murphy
Jennifer Gallo-Fox
Karen Carlisle
Kathryn Scantlebury
Kenneth G. Tobin
Sonya Martin

Strand 8: Symposium: Beginning/Newly Qualified Science Teachers: Guiding This Emerging Domain
Room: Dover B
Presider: Julie Luft
Julie Bianchini
Barbara A. Crawford
Betsy Davis
Julie Luft
Mark Olson
John Tillotson

Strand 8: Coordinator Organized Paper Set: Praxis and Views of Inquiry Teaching
Room: Kent C
Presider: Kathy Roth

Paper 1: Improving Science Through Authentic Inquiry
Nikki L. Hanegan
C. R. Nelson

Paper 2: Preparing Elementary School Teachers to Integrate Inquiry Science Instruction and Language Development for English Language Learners
Trish Stoddart
Sara E. Tolbert

Paper 3: Lesson Study in Elementary School Science: Steps to Investigative Culture
Martha H. Galganski
Tommie Y. Turner

Paper 4: Infusing Inquiry Teaching into Classroom Practice: A Junior High School Science Teacher’s Professional Development Experience
Jun-Yi Chen
Huey-Por Chang
Chorng-Jee Guo
Wen-Yu Chang

Strand 9: Coordinator Organized Paper Set: Reflective Practice and Science Teacher Education I
Room: Laurel B
Presider: Jerine Pegg

Robert M. Danielowich

Paper 2: Attitudes and Behaviors of Teachers Exposed to Action Research
Marianne B. Barnes
Lehman W. Barnes
Jerry Everhart

Paper 3: Professional Development: The Role of Principals in Supporting Action Research
Isha DeCoito
Erminia Pedretti
Derek Hodson
Maurice DiGiuseppe
Larry Bencze
Lisa Serebrin

Strand 10: Coordinator Organized Paper Set: Curriculum Implementation III
Room: Essex C
Presider: Jeanne R. Century

Paper 1: Competing Horizons: Biology Instruction and No Child Left Behind
Isaak Aronson

Paper 2: Comparison of Curricular Emphasis on Inquiry and NAEP Science Scores
John Murdock

Paper 3: Scaling-Up a Middle School Motion and Forces Unit in a Large, Diverse School District: Results and Implications of a Quasi-Experiment
William A. Watson
Curtis Pike
Sharon J. Lynch
Robert J. Ochsendorf

Xiufeng Liu
BaoHui Zhang
Ling L. Liang
Gavin Fulmer
Beaumie Kim
Strand 11: Coordinator Organized Paper Set: Investigating Culture and Learning
Room: Laurel A

Presider: Jon Saderholm

**Paper 1: Culturally-Sensitive Pedagogy in an Elementary Science Classroom: A Case Study of a Hmong Elementary Teacher**
Bhaskar Upadhyay

**Paper 2: Notes on Making STEM (Science, Technology, Engineering and Mathematics) Education a Culturally Transformative Tool for African Americans**
Jomo Mutegi
LaTasha R. Thompson
Julius Davis

**Paper 3: “It’s Asking Me Like As If I Were the Mother… “: Examining How Students From Different Cultural Groups Interpret Test Items**
Min Li
Guillermo Solano-Flores
Melissa Kwon
Shinping Tsai

Strand 13: Coordinator Organized Paper Set: Teachers’ Views (or Understandings) of the Nature of Science
Room: Kent A

Presider: Mike U. Smith

**Paper 1: Exploring the Influence of an Argumentation-Based Science Content Course on Preservice Elementary Teachers’ Views of Nature of Science**
Christine V. McDonald

Mansoor Niaz

**Paper 3: Experienced Science Teachers’ Talks on Teaching SSI: Exploration of Teachers’ Personal Practical Knowledge**
Hyunju Lee
Hyunsook Chang

**Paper 4: Linking Progressive Development of Teachers’ Understandings of Nature of Science and Scientific Inquiry with Progressive Development of Instructional Ability**
Norman G. Lederman
Judith S. Lederman
Kevin White

Strand 14: New Poster Symposium: Learning Progressions for Environmental Science Literacy (Cross-Listed in Strand 1)
Room: Grand Ballroom Salon II

Presider: Julie Lambert

**Paper 1: Comparing Palestinian and American Students’ Accounts of Water in Environmental Systems**
Hasan Abdel-Kareem
Charles W. Anderson

**Paper 2: Developing a Learning Progression for Energy in Environmental Systems**
Hui Jin
Charles W. Anderson

**Paper 3: Developing a K-12 Learning Progression for Carbon Cycling in Socio-Ecological Systems**
Jing Chen
Lindsey Mohan
Charles W. Anderson

**Paper 4: Developing a Learning Progression for Environmental Science Citizenship**
Blakely K. Tsurusaki
Beth A. Covitt
Edna Tan
Charles W. Anderson

**Paper 5: Developing Progress Variables for the Carbon Cycle**
Karen Draney
Jinnie Choi
Yong-Sang Lee
Mark Wilson

**Paper 6: Learning Progressions for Environmental Science Literacy**
Charles W. Anderson
Joe Krajcik
Richard A. Duschl
Kristin Gunckel
Blakely K. Tsurusaki
Karen Draney

**Paper 7: The Development of a K-12 Learning Progression for Biodiversity in Environmental Systems**
Josie Zesaguli
Blakely K. Tsurusaki
Brook Wilke
Charles W. Anderson
Christopher D. Wilson
Paper 8: A Learning Progression for Processes that Move Water through Socio-Ecological Systems
Kristin Gunckel
Beth A. Covitt
Hasan Abdel-Kareem
Charles W. Anderson
Rebecca Dudek

Paper 9: A Learning Progression for Processes that Alter Water Quality in Socio-Ecological Systems
Beth A. Covitt
Kristin Gunckel
Hasan Abdel-Kareem
Charles W. Anderson
Rebecca Dudek

Session 7
4:45PM – 6:15PM

Research Committee Sponsored Workshop: How Far We Have Come After Two Decades of Progress: A Re-Visitation to the Challenge of “Science For All Americans.”
Room: Dover A
Presider: Kenneth G. Tobin
Kenneth G. Tobin
Alberto Rodriguez
Deborah Tippins
Wolff-Michael Roth
Cathy Zozakiewicz
Nancy Brickhouse

Strand 1: Coordinator Organized Paper Set: Examining Beliefs and Understandings in Science
Room: Essex B
Presider: Claudia von Aufschnaiter

Paper 1: A Learning Progression for Understanding the Context, Cyclic Nature, and Timescales Associated With the Rock Cycle
Molly L. Yunker

Paper 2: Learning to Think about Gravity I: From Aristotle to Newton
Claudine I. Kavanagh
Esther L. Zirbel
Cary Sneider

Paper 3: Using Formative Assessment to Promote Conceptual Change
Yue Yin
Miki K. Tomita
Richard J. Shavelson

Paper 4: Effectiveness of a Learning Pathway Based on Model Construction and Criticism Theory
Maria C. Nunez-Oviedo
Rosa Catalan
Juan Godoy
Sergio Rojas

Strand 2: Coordinator Organized Paper Set: Learning from Shared Experiences and Discourse in Science Education
Room: Grand Ballroom Salon IV
Presider: Obed Norman

Paper 1: Making Meaning of Shared Experiences Using Cogenerative Dialogues
Gillian U. Bayne

Paper 2: Effects of Computer Simulation on English Language Learners' Science Learning
Kihyun Ryoo

Paper 3: Orchestrating Productive Discussions: A Study of Dialogic Exchange in Science Classrooms
Lindsey Mohan

Paper 4: Exploring Students' Dialogue with Evolution and the Influence of their Questions in the Teacher's Discourse
Eduardo F. Mortimer
Marina Lima-Tavares
Maria Pilar
Jimenez Aleixandre

Strand 3: Coordinator Organized Paper Set: Professional Development of Inservice Primary Teachers
Room: Grand Ballroom Salon 1
Presider: Mark Guy

Paper 1: The Effects of a Science Teaching Intervention on Elementary Teachers’ Beliefs About Science Teaching
Cynthia Lundeen
Diana C. Rice
Sibel Kaya
Paper 2: Pedagogical Content Knowledge for Teaching the Nature of Science: A Study of Teachers Effective in Impacting Students’ Views
Deborah Hanuscin
Michele H. Lee
Valarie L. Akerson

Julie Haun-Frank
Sue C. Kimmel
Heidi Carlone
Margaret Vaughn

Paper 4: Getting the Big Picture: The Impact of a Summer Workshop on Teachers’ Views of Scientific Inquiry, Nature of Science and Classroom Interaction
Khemmawadee Pongsanon
Alan Oliveira
Valarie L. Akerson
Abdulkadir Genel
Huseyin Colak

Strand 4: Symposium: Popularity and Relevance of Science Education and Scientific Literacy - The PARSEL Project in Europe
Room: Dover C

Presider: Wolfgang K. Graeber

Wolfgang K. Graeber
Claus Bolte
Jack Holbrook
Avi Hofstein
Martin Lindner
Jan Alexis Nielsen
Rachel Mamlock-Naaman

Strand 4: Coordinator Organized Paper Set: Teacher/Teaching Comparisons
Room: Kent A

Presider: Saouma B. BouJaoude

Paper 1: A Study of the Science Inquiry Learning Environments Created by National Board Certified Teachers
Jon Saderholm

Paper 2: Describing and Comparing Mathematics and Science Teaching: Subject Culture Under the Microscope
Linda M. Darby

Richard J. Vath
Anna Switzer

Paper 4: Experienced and Novice Teachers’ Concepts of Scale
Gail Jones
Thomas R. Tretter
Amy Taylor
Tom Oppewal

Strand 5: Coordinator Organized Paper Set: Conceptual Reasoning and Development
Room: Essex A

Presider: Kristy L. Halverson

Paper 1: Analysis of Learning Progressions Using Classification Tasks: Application to the Intermolecular Forces Concept
Marilyne Stains
Vicente Talanquer

Paper 2: The Metacognition of College Science Students
Janice M. Bonner
William Holliday

Paper 3: The Impact of Undergraduate Research Experiences on the Graduate Student/Postdoctoral Fellow Mentor
Deborah Johnson
Kathryn A. Smith
Erin L. Dolan

Paper 4: Enhancing Undergraduate Students’ Nano-literacy Through an Instructional Module
Denise L. Drane
Su Swarat
Eun Jung Park
Kathy Chen
Thomas Mason

Strand 6: Coordinator Organized Paper Set: Tracking Conceptual Change in Informal Science
Room: Laurel C

Presider: Lynn D. Dierking

Paper 1: Changes in Children’s Conceptions of Nature Following a Residential Environmental Education Experience
Bryan M. Rebar

Paper 2: Uncovering Visitor Conceptions of Fossils and the Fossil Record
James F. Kisiel
Jeanine Ancelet
**Monday, March 31**

**Paper 3: Visitors' Geological Conceptions and Meaning Making at Petrified Forest National Park**
Nievita F. Bueno Watts
Steven Semken
Monica Pineda
Cheryl Alvarado

**Paper 4: Science Learning in a Leisure Setting**
John Falk
Martin Storksdieck

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**Strand 7: Coordinator Organized Paper Set: Examining Teacher Education/Certification Programs I**
Room: Kent B
Presider: Robert D. Sherwood

**Paper 1: Hybrid Coursework in Teacher Preparation: Teacher Education's Structural Response to Increased Demand for Highly Qualified Science Teachers**
Brian C. Baldwin

**Paper 2: Factors Underlying Decisions to Pursue Alternative Routes to Secondary Science Certification**
Fouad Abd-El-Khalick

**Paper 3: Recent Policy Documents with Implications for STEM Teacher Education and Research**
Robert D. Sherwood

**Paper 4: Landscape Baseline Data in a Large Scale Science Teacher Preparation Model**
J Randy McGinnis
Gili Marbach-Ad
Scott Jackson Dantley
Benson Spencer
Amy Dai
Rebecca Pease

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**Strand 8: Coordinator Organized Paper Set: Aspects of Learning in Professional Learning Communities**
Room: Dover B
Presider: Kate Popejoy

**Paper 1: An Analytical and Interpretive Framework for Examining Social Interactions in Professional Learning Communities**
Hui Jin
Gail Richmond

**Paper 2: Conditions for Collaborative Knowledge Construction of Inservice Science Teachers in Problem-Based Professional Development**
Meilan Zhang
Mary Lundeberg
Tom J. McConnell
Matthew J. Koehler
Jan Eberhardt

**Paper 3: Inquiry into Practice: How Teachers Learn to Engage Their Students in Model-Based Reasoning**
Cynthia Passmore
Connie Hvidsten
Lin Xiang
Arthur Beauchamp
Wendell Potter
Hedman Rich

**Paper 4: Teachers' Collaborative Inquiry: Making Sense of Classroom-Based Data**
Tamara D. H. Nelson
Angie Foster
David Slavit
Anne Kennedy
Wendi Laurence

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**Strand 8: Related Paper Set: Studies on Teacher Professional Development**
Room: Kent C
Presider: Silke Mikelskis-Seifert

**Paper 1: Can a Learning-Process Oriented Training of Physics Teachers Using Video-Feedback Alter Teachers' Subjective Beliefs?**
Rainer Wackermann
Georg Trendel
Hans E. Fischer

**Paper 2: Studies on Video-Based Physics Teacher Professional Development**
Claudia Kastens
Reinders Duit
Manfred Lehrke

**Paper 3: Physics Teacher Professional Development in the Program 'Physics in Context'**
Silke Mikelskis-Seifert
Reinders Duit

**Paper 4: Do Teacher In-Service Training Courses Have an Impact on Teachers' Conceptions of Teaching and Learning and on Students' Understanding in Primary Science?**
Thilo Kleickmann
Kornelia Miller
**Strand 10: Coordinator Organized Paper Set: Curriculum Reform**  
Room: Essex C  
Presider: Brian J. Reiser

**Paper 1: Teachers’ Perceived Meanings of Their New Curriculum Reforms: Lessons from One School District in South Africa**  
Bongani D. Bantwini

**Paper 2: Enactment Indicators of Reform Outcomes in Science Textbooks: An Holistic Look**  
Ajda Kahveci

**Paper 3: Under Cultural Conflict: Change of the Teacher Discourses About Taiwanese Curriculum Reform**  
Yun-Ping Ge  
Huey-Por Chang  
Kuo-Hua Wang

**Paper 4: Characterizations of Inquiry: Science Teachers’ Descriptions of Curriculum Reform**  
Ann Rivet  
Mary Petzoldt  
Jenny Ingber  
Jessica F. Riccio

**Strand 11: Symposium: Pathways to New Possibilities: Creolized Science, Solidarity, and Hybrid Identities**  
Room: Laurel A  
Presider: Rowhea Elmesky

Rowhea Elmesky  
Gale Seiler  
Christopher Emdin  
Lisa Singletary  
Wesley B. Pitts

**Strand 12: Coordinator Organized Paper Set: Technologies as Tools for Teaching and Learning**  
Room: Laurel B  
Presider: Susan A. Yoon

**Paper 1: Instructional Strategy Enhancing Learners’ Sense Toward Online Classroom Community**  
Ruey S. Shieh

**Paper 2: Educational Software Evaluation Scale: The Study of Validity and Reliability**  
Yilmaz Kara

**Paper 3: Students Becoming Information Technology Fluent: Technology-Embedded Environmental Research Studies**  
Jazlin Ebenezer  
Osman Kaya  
Dionysius Gnanakkan

**Paper 4: A Collaborative Support Tool for Problem-Solving Ability: Idea Storming Cube**  
Chun-Chieh Huang  
Chun-Yen Chang  
Tsai-Yen Li  
Hao-Chuan Wang

**Strand 14: Symposium: Intersection of the Influence of Schooling, Culture, and Nature on the Motivation of Hawaiian and Taiwanese Indigenous Children**  
Room: Grand Ballroom Salon II  
Presider: Joel Mintzes

**Paper 1: The Intersection of The Influences of Schooling, Culture And Nature on The Motivation of Hawaiian and Taiwanese Indigenous Children**  
Eleanor D. Abrams  
Chuing-Fen Yen  
Larry Yore  
Pauline W. Chinn  
Huei Lee  
Erica Blatt  
Chorgn-Jee Guo

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**Evening Events**

6:30PM – 7:30PM  
Membership and Election Committee-Sponsored Graduate Student Forum  
Room: Dover C

6:30PM – 8:30PM  
Journal of Research in Science Teaching Editorial Board Meeting/Dinner  
(Board meeting open to all, Dinner by invitation only)  
Room: Grand Ballroom IX
NARST Committee Meetings  
7:00AM – 8:15AM

NARST Outstanding Paper Award Selection Committee Meeting  
Room: Essex A

Equity and Ethics Committee Meeting  
Room: Laurel A

External Policy and Relations Committee Meeting  
Room: Laurel B

International Committee Meeting  
Room: Essex B

Membership and Election Committee Meeting  
Room: Laurel C

Program Committee Meeting  
Room: Laurel D

Publications Advisory Committee Meeting  
Room: Kent A

Research Committee Meeting  
Room: Kent B

Ad hoc History of Science Education Committee Meeting  
Room: Kent C

Outstanding Doctoral Research Award Selection Committee  
Room: Essex C

JRST Award Selection Committee  
Room: Dover A

Early Career Research Award Selection Committee  
Room: Dover B

Distinguished Contributions in Research Award Selection Committee  
Room: Dover C

Ad hoc Practitioner Research Committee Business Meeting  
Room: Grand Ballroom Salon I

Session 8  
8:30AM – 10AM

Publications Advisory Committee Sponsored Session: Publication in the Journal of Research in Science Teaching  
Room: Dover A  
Presider: Barbara A. Crawford

J. Randy McGinnis
Angelo Collins

External Policy and Relations Committee Sponsored Session: Taking Action--What Can NARST Members Do to Inform Policymakers and the Public-At-Large?  
Room: Grand Ballroom Salon IV

Presider: Catherine Milne

Jodi Peterson
Lynn A. Bryan

Strand 1: Coordinator Organized Paper Set: Inquiry and Design  
Room: Essex B

Presider: Gregory P. Thomas

Paper 1: Utilizing Contrasting Cases to Target Science Reasoning and Content in a Design-for-Science Unit  
Eli M. Silk
Christian D. Schunn

Paper 2: Fifth Grade Students’ Understandings About Inquiry and Doing Inquiry  
Eunkyung Ko
Norman G. Lederman

Paper 3: Skills and Levels of Students’ Inquiry Competence in Lower Secondary Biology Education (Grade 5-10)  
Andrea Moeller
Christiane Grube
Juergen Mayer

Paper 4: A Cross-Analysis for High-School Students’ Personal Epistemology and Understanding About Inquiry  
Fang-Ying Yang
Ying-Shao Hsu
Meng-Jung Tsai

Strand 2: Symposium: Reading Scientific Texts: Adapting Primary Literature for Promoting Scientific Literacy  
Room: Laurel D

Presider: Stephen Ritchie

Linda M. Phillips
Anat Yarden
Hedda Falk
Stephen P. Norris
Maria Pilar Jimenez Aleixandre
Danielle J. Ford

Room: Grand Ballroom Salon 1

Presider: Katherine McNeill
Paper 1: A Comparison of Field and University Based Science Methods Courses’ Impact on Preservice Teacher’s View of How Students Learn Science
Anne P. Gatling
Katherine McNeill
Dean Martin
Michael Barnett

Paper 2: Classroom Inquiry Style and Its Influence on Preservice Elementary Teachers’ Science Teaching Practice
Annmarie R. Ward
Carla Zembal-Saul

Paper 3: Beginning Elementary Teachers’ Learning to Use Questions and Questioning in Inquiry-Oriented Science Teaching: A Longitudinal Study
Cory T. Forbes
Elizabeth Davis

Paper 4: A Professional Development Program for In-Service Elementary Teachers: Supporting Curriculum Planning and Enactment Grounded in the Psychological Tools of Science
Wendy M. Sink
Jennifer Cartier

Strand 4: Symposium: Hominid Evolution: Theory, Facts, and ‘Tales’ from the Field
Room: Dover C

Presider: Norman F. Thomson
Norman F. Thomson
Jennifer Adams
Sam Odell
Seri Chapman
David Jackson
Jacque Magner

Strand 4: Coordinator Organized Paper Set: Teachers’ Beliefs and Interactions
Room: Kent A

Presider: SueAnn I. Bottoms

Paper 1: The Influence of Beliefs, Knowledge and Goals on the Implementation of Literacy Strategies in the Science Classroom
Kirsten K. Mawyer
Daniel C. Edelson

Paper 2: The Analysis of Instructional Variations Among Chemistry Teachers
Soonhye Park
J. Steve Oliver

Paper 3: Teachers’ Pedagogical Beliefs About SSI and Scientific Literacy in Israel
Lea Segal
Dana L. Zeidler
Ariel Cohen

Paper 4: Content Knowledge for Teaching as Reflected in Teacher-Student Interactions: Two Video Case Analyses
Alicia C. Alonzo
Mareike Kobarg
Tina Seidel

Strand 5: Coordinator Organized Paper Set: Methods of Earth Science Instruction
Room: Essex A

Presider: Kate Popejoy

Paper 1: Earth Science Teachers’ Perceptions of Autonomous Informal Education Assignments in a Nationwide Online Paleontology Course
Renee M. Clary
James H. Wandersee

Paper 2: Using Geologic Time Inquiry-Based Activities to Enhance Student Learning in the Introductory Geoscience Labs
Iris M. Totten
Mo Morse

Eric M. Riggs
Russell Balliet
Christopher C. Lieder

Paper 4: Should “Proof” and “Truth” Be Targeted First? Evidence for Addressing Some Nature of Science Concepts and Misconceptions Earlier Than Others
Joanne K. Olson
Michael P. Clough
David Vanderlinden

Strand 6: Coordinator Organized Paper Set: Out of School Contexts
Room: Laurel C

Presider: David Anderson

Paper 1: Scientific Literacy: College Students’ Evaluations of Media Reports
Connie A. Korpan
Tuesday, April 1

**Paper 2: A Study of Sixth Graders’ Creativity and Problem-solving Ability Through Othello Games**  
Wanchu Huang  
Huei-Huei Lin

**Paper 3: A Link between Science and Life: An Evaluation of Everyday Science Class**  
Mijung Kim  
Heesook Yoon  
Youngrae Ji  
Jinwoong Song

**Paper 4: SPARK! Igniting Student Interest in STEM Through Engineering Design**  
Jennifer Chidsey Pizzo  
Rashmi Kumar  
Wendy Green  
Susan A. Yoon

**Strand 7: Coordinator Organized Paper Set: Preservice Teachers’ Problems of Practice and Rethinking Teacher Education Approaches**  
Room: Kent B  
Presider: Steven F. Tuckey

**Paper 1: Enacting Systems Thinking in Science Education**  
Anna Lewis

**Paper 2: Exploration of Korean Preservice Elementary Teachers’ Science Teaching-Anxiety and Science Teaching-Efficacy**  
Sung-Youn Choi  
Sung-Won Kim

**Paper 3: Framing Future Discussions and Research on Science Literacy**  
Steven F. Tuckey  
Charles Anderson  
Kelly M. Merritt  
Hosun Kang  
Mark Conley

**Paper 4: Understanding Science Teacher Candidates’ Views of Problems of Practice: Scientific Literacy and Students**  
Hosun Kang  
Charles W. Anderson  
Steven F. Tuckey  
Kelly M. Merritt  
Mark Conley

**Strand 8: Coordinator Organized Paper Set: From Learning to Teaching Science**  
Room: Kent C  
Presider: Kevin Carr

**Paper 1: Capitalizing on Teacher Expertise: Contemplating Transfer From Professional Development to the Classroom Through Effective Use of Pedagogical Contexts**  
Andrea Gay

**Paper 2: From Learning Science to Teaching Science: What Transfers?**  
Danielle B. Harlow

**Paper 3: Professional Development in Practice**  
Victoria M. Deneroff

**Paper 4: Do Middle School Teachers Integrate Content They Learn in a Physical Science Distance Learning Course into Their Instruction?**  
Rebecca McNall Krall  
Joe P. Straley  
Sally A. Shafer  
Kelly D. Bradley  
Jessica D. Cunningham  
Jeffrey L. Osborn

**Strand 8: Symposium: Exploring the First Year of Teaching in Secondary Science Classrooms**  
Room: Dover B  
Presider: Gillian H. Roehrig  
Julie Luft  
Gillian H. Roehrig  
Jennifer Neakrase  
Jonah Firestone  
Allison Kirchhoff  
Selcen Guzey  
Younkyeong Nam  
Ann Kern  
Ira Materassi  
Krista Adams  
Eun Bang  
Mary Sande

**Strand 10: Coordinator Organized Paper Set: Assessment Development I**  
Room: Essex C  
Presider: George DeBoer

**Paper 1: Students’ Competence of Argumentation**  
Nicola Mittelsten Scheid  
Corinna Hößle

**Paper 2: Using Concept Cartoons as a Formative Assessment and Learning Tool in Science**  
Christine Chin  
Lay-Yen Teou
Paper 3: The Effects of Portfolio Assessment on Student Outcomes in Chemistry
Jeffrey S. Carver
William J.F. Hunter

Strand 11: Symposium: Perspectives of Scholar Activism, Pragmatism, and Orchestration in Science Education
Room: Laurel A
Presider: Adam Johnston
Adam Johnston
John Settlage
David Moss
Heidi Carlone

Strand 12: Coordinator Organized Paper Set: Learning with Technologies
Room: Laurel B
Presider: Yilmaz Kara

Paper 1: Integrating Physics and Math Through Microcomputer-Based Labs (MBL): Effects on Discourse Type and Quality and Mathematization
Saouma B. BouJaoude
Murad E. Jurdak

Paper 2: The Connected Classroom: Physical Science Case Studies
Karen E. Irving
Vehbi A. Sanalan
Melissa L. Shirley

Paper 3: Unraveling the Influence of Haptic Feedback on Students’ Learning about Levers
Eric N. Wiebe
M. Gail Jones
James Minogue
Jennifer Cowley
Denise Krebs

Strand 14: Coordinator Organized Paper Set: Environmental Education in Elementary School Settings
Room: Grand Ballroom Salon 11
Presider: Rita Anne Hagevik

Paper 1: An Urban Elementary Teacher’s Experience Surrounding Her Students’ Participation in an Outdoor Environmental Science Field Trip
Peggy L. Preusch

Paper 2: Back in the Classroom: Teacher Influence on Students’ Environmental Understandings, Perceptions, and Actions Following an Earth Education Program
Lisa Felix
Bruce Johnson

Paper 3: A Case Study of NatureWatch within an Elementary School: Schools, Teachers, Students, and Community Based Monitoring (CBM)
Douglas Karrow
Xavier Fazio

Paper 4: Examining Elementary Students’ Understanding of Farming and Food Growing Related Issues
Oksana Bartosh
Jolie Mayer-Smigh
Linda Peterat

Break
10:00AM – 10:30AM

Plenary Session 2
10:30AM – 11:45AM
Room: Grand Ballroom V & VI

Program Committee Sponsored
Plenary 2: Peter Fensham – Keynote Speaker

Science Education Research and Science Education Policy: A Too Often Overlooked Link
Presider: Charlene M. Czerniak

Awards Luncheon
Room: Grand Ballroom VII & VIII
12:00PM – 1:45PM

Session 9
2:00PM – 3:30PM

International Committee Sponsored Session: Reforms in Science Education in Different Countries
Room: Dover A
Presider: Mei-Hung Chiu

David Treagust
Uri Zoller
Christine Chin
Avi Hofstein
Gilberto Alfaro-Varela
Strand 1: Related Paper Set: Effect of Model-Based Physics Instruction on the Development of Problem Solving and Metacognitive Strategies
Room: Essex B

Presider: Esther L. Zirbel

Paper 1: The Effect of Model-based Physics Instruction on the Development of Problem Solving and Metacognitive Strategies
Kathy Malone

Paper 2: The Impact of a Modeling Based Ninth Grade Physics Curriculum on Scientific Reasoning and Mathematics Concepts
Anita Schuchardt
Kathy Malone
Bill Diehl
Kamille Harless
Dudley Parr
Robert McGinnis

Paper 3: How Mathematical Literacy Impacts Inquiry in Physics
Doug Vallette
Nanette Dietrich

Paper 4: Adapting to Modeling Instruction over Time
Jeff Saul
Lloyd Kramer
D. Jones
Eric Brewe
G. O. Brian

Paper 5: Framing Student Discourse for Optimal Learning in Physics
Colleen Megowan-Romanowicz

Strand 2: Coordinator Organized Paper Set: Building Successful Relationships in Science Classrooms and Laboratories
Room: Laurel D

Presider: Erin M. Furtak

Paper 1: A Comparative Science Study: Uncertainty in the Laboratory and in the Science Education Classroom
Susan A. Kirch

Paper 2: Conflict in Cooperative Learning Groups in an Elementary Science Methods Course
Scott B. Watson
Glenna Dunn

Paper 3: A Comparison of Science and Mathematics Teachers’ Interpersonal Behaviour With Teachers of Other Subjects
Perry den Brok
Ruurd Taconis
Darrell L. Fisher

Per Högström
Christina Ottander
Sylvia Benckert

Strand 3: Coordinator Organized Paper Set: Student Learning and Conceptions in Primary Science
Room: Grand Ballroom Salon 1

Presider: Shireen Desouza

Paper 1: Integrating Science and Literacy: Does One Size Fit All?
Leigh K. Smith
Kendra M. Hall
Janet Losser
Paper 2: The Impact of an Integrated Science Reading Intervention on Elementary Children’s Misconceptions Regarding Slow Geomorphological Changes Caused by Water
Patricia Martinez
Brenda Bannan-Ritland
Anastasia Kitsantas
John Baek

Paper 3: Promoting Children’s Reasoned Argumentation on a Complex Socioscientific Issue
May Jadallah
Brian Miller
Richard C. Anderson
Kim Nguyen-Jahiel

Paper 4: Effects of the Implementation of Science Writing Heuristic on Students’ Understanding of Electricity Unit in 6th Grade Setting in Turkey
Esra Kabatas
Murat Gunel
Erdogan Buyukkasap
Mustafa Uzoglu
Brian Hand

Strand 4: Symposium: Teacher Learning of Technology-Enhanced Formative Assessment
Room: Dover C
Presider: Ian D. Beatty

Ian D. Beatty
Allan P. Feldman
Hyunju Lee
Karen St. Cyr
Robby Harris

Strand 5: Coordinator Organized Paper Set: College Science Faculty Development
Room: Essex A
Presider: Vicente Talanquer

Paper 1: Identity Conflicts in College Science Teaching
Robert J. Ceglie
John Settlage

Paper 2: Utilizing K-12 Science Education Partnerships to Develop Better Scientists: Integrating Pedagogy and Partnership Experiences into Graduate Science Training
Allison Busch
Kimberly D. Tanner

Paper 3: Drivers for Change in Faculty Members Thinking About Teaching
Erika Offerdahl
Lisa Elfring
Debra Tomanek

Paper 4: Exploring Scientific Research Disposition from the Perspective of Academic Professors
Roeland M. Van der Rijst
Jan H. van Driel
Jan W. Kijne
Nico Verloop

Strand 6: Coordinator Organized Paper Set: Seeing Science Learning in Wider Contexts
Room: Laurel C
Presider: Martin Storksdieck

Paper 1: Growing A Scientist: Scientists’ Experiences, Relationships, and Identity Formation
Jennifer Forrester
Gail Jones

Paper 2: Designing Curricula to Bridge Informal and Formal Learning Environments
Jenny Ingber
Nicholas Stroud
Megan Roberts
Katherine Brown
Emily Noto

Paper 3: Student Learning in an Informal Setting: Rainforest Ecology in the Amazon
Enrique M. Pareja
Sandra K. Abell

Strand 7: Coordinator Organized Paper Set: Role of Clinical Field Experiences in Preservice Teachers’ Development
Room: Kent B
Presider: Jacqueline Leonard

Paper 1: Cases Studies of Elementary Preservice Teachers’ Science Efficacy and Inquiry-Based Practices in Urban Schools
Jacqueline Leonard
James E. Davis

Paper 2: Field Experiences of Elementary Preservice Teachers: Does the Involvement of the Science Methods Instructor Make a Difference in New Teacher Confidence?
Jacqueline T. McDonnough
Juanita Jo Matkins

Paper 3: One-to-One Field Experiences: How Do Child-Interactions Influence Elementary Preservice Teachers’ Science Confidence and Content Knowledge?
Julie Thomas
Ratna Narayan
Paper 4: The Role of the Practicum Experience in Supporting Secondary Pre-Service Teachers’ Implementing Inquiry Based Science
Xavier Fazio
Wayne Melville
Anthony Bartley

Room: Kent C

Presider: Robert M. Danielowich

Paper 1: Understanding the Affordances of an Online Induction Program for Beginning Science Teachers
Joel D. Donna
Gillian Roehrig

Paper 2: What Misconceptions Do US Teachers Have About Lesson Study?
Andrew B. West
Mark Volkman

Paper 3: Practice-Based Professional Development: Design Considerations for New and Experienced Users of Curriculum Materials
Heather Johnson
Kirsten K. Mawyer
Daniel C. Edelson

Strand 8: Symposium: Impact of Socioscientific Issues Research on Research, Policy and Practice
Room: Dover B

Presider: Troy D. Sadler

Dana L. Zeidler
Troy D. Sadler
Martina Nieswandt
Chin-Chung Tsai
Vaille M. Dawson
Grady J. Venville

Room: Laurel B

Presider: Jerine Pegg

Carol Stuessy
Dane Bozeman
Toni Hollas
Toni A. Ivey
Rasheedah Richardson
Sara Spikes
Thomas Stiles

Caroline Vasquez
Robert Wilson

Strand 10: Coordinator Organized Paper Set: Curriculum Analysis: Textbooks
Room: Essex C

Presider: Regina Toolin

Paper 1: Seeing the Wood for the Trees: An Analysis of Evolutionary Diagrams in Biology Textbooks
Kefyn M. Catley
Laura R. Novick

Paper 2: The Analysis of Diabetes Education in High School Biology Textbooks
Deanna M. Lankford
Lloyd H. Barrow

Paper 3: Effects the Representational Structures on Students’ Nervous System Image Reading Comprehension
Wen-Gin Yang
De-Wei Feng
Jia-Cheng Ye

Paper 4: Balance of Scientific Literacy Themes in Zambian High School Chemistry Textbooks, Syllabus and Examinations
Frackson Mumba
Vivien M. Chabalengula
William J. F. Hunter

Strand 11: Symposium: Promoting New Directions in Science Education: Part 2, Conceptual Frameworks
Room: Laurel A

Presider: Felicia M. Moore

Felicia M. Moore
Magnia George
Eileen C. Parsons
Brian Williams
Jomo Mutegi
Bryan Anthony Brown

Strand 13: Coordinator Organized Paper Set: Methodology and Pedagogy in the History, Philosophy, and Sociology of Science
Room: Kent A

Presider: Valerie L. Akerson

Paper 1: Conceptualizing Scientific Explanations in Science Education: Methodological and Pedagogical Considerations
Deniz Peker
Paper 2: Utilizing Nature of Science as the Context of Doing Science  
Byoung-Sug Kim  
Norman G. Lederman

Paper 3: Scientific Argumentation and Teacher Expectations  
Jeremy Peterson  
Laura C. Price  
Nikki L Hanegan

Paper 4: The Relationship Between Nature of Science and Argumentation  
Rola Khishfe  
Shannon Palouci  
Todd Medintz

Strand 14: Coordinator Organized Paper Set: Environmental Education in Secondary School Settings  
Room: Grand Ballroom Salon 11  
Presider: Julie Lambert

Paper 1: The Interplay Between Teachers’ and Students’ Personal Values and the Development of Environmental Action Projects Within Two Middle School Classrooms  
Kim E. Charmatz

Paper 2: Leveraging GIS Technology in Urban Schools to Visualize Impact of Urban Forests on Climate, Energy Use and Air Quality  
Michael Barnett  
Meredith E. Houle  
Michelle Smith

Paper 3: Effects of Ethnicity and Gender on 6th Grade Students’ Environmental Knowledge and Attitudes  
Rachel M. Shelton  
Sybil S. Kelley  
William G. Becker

Break  
3:30PM – 4:00PM

Session 10  
4:00PM – 5:30PM

Ad hoc History of Science Education Committee Sponsored Session: Science Education Research Traditions in Europe: Shedding Light on Didactics  
Room: Dover A  
Presider: Fouad Abd-El-Khalick

Strand 1: Coordinator Organized Paper Set: Inquiring into Understanding in the Physical Sciences  
Room: Essex B  
Presider: Adam Johnston

Paper 1: Research And Instruction-Based/Oriented Work (RAINBOW) for Conceptual Change in Science Learning – An Example of Students’ Understanding of Gas Particles  
Mei-Hung Chiu

Paper 2: Evolution of Students’ Model-Building Practices  
Valerie K. Otero  
Danielle B. Harlow

Paper 3: Using Rasch Analysis and Classroom Observations to Examine High-Stakes Testing  
Catherine Milne  
Jimmy Ma

Paper 4: Exploring Variations in and Developing Typology for Undergraduate Students’ Conception of “Size and Scale”  
Eun Jung Park  
Su Swarat  
Greg Light  
Denise Drane

Strand 2: Coordinator Organized Paper Set: Exploring Encounters in Science Education  
Room: Grand Ballroom Salon IV  
Presider: Mark James

Paper 1: Don’t Say Yuk, Say ‘Hum’: The Role of Interjections in Students’ Engagement During Science Fieldtrips  
Bruno D. O. Jayme

Paper 2: Synchronizing Face-to-Face Encounters to Produce Success in Urban Science  
Kenneth G. Tobin

Paper 3: Potentialities Beyond Deficit Perspectives: Improving Solidarity and Science Fluency During Chemistry Laboratory Activities in Urban High Schools  
Wesley B. Pitts
Paper 1: Integrated Science Literacy Enactments: Spaces for Production of Scientific Knowledge
Maria Varelas
Christine C. Pappas
Angela Calabrese-Barton

Paper 2: Distinctive Interactions: Young Children's Language Acts in Dialogic Curriculum Genres
Eli Tucker-Raymond
Christine C. Pappas
Maria Varelas
Ibett Ortiz

Justine M. Kane
Maria Varelas
Christine C. Pappas
Jennifer Hankes

Paper 4: Intertextuality and Gender in Primary-Grade, Rural Classrooms: Girls Making Sense in Science Read-Alouds
Amy Arsenault
Maria Varelas
Christine C. Pappas
Anne Barry
Neveen Keblawe-Shamah

Strand 4: Coordinator Organized Paper Set: Inquiring into Inquiry
Room: Dover C
Presider: Angela M. Kelly

Paper 1: Teacher Commitments and Resources to Facilitating Evidence-Based Reasoning in an Inquiry-Based Curriculum
David Grueber

Paper 2: Investigating the Effectiveness of Inquiry-Based Versus Traditional Science Teaching Methods in Middle and High School Laboratory Settings
Margaret R. Blanchard
Sherry A. Southerland
Leonard A. Annetta

Judith S. Lederman
Norman G. Lederman
Per-Olof Wickman

Paper 4: Force and Motion: Problem Solving Strategies
Lori L. Petty
David Lamp
Ratna Narayan
Sandi Cooper
Julie Thomas
William Lan
Mary Tallent Runnels

Strand 4: Related Paper Set: Students Argumentative Discourse in a Seismology Inquiry Unit
Room: Kent A
Presider: Scott P. McDonald

Paper 1: Student Argumentative Discourse in a Seismology Inquiry Unit
Steven C. Kerlin
Scott P. McDonald
Gregory J. Kelly

Paper 2: An Investigation of the 'Dead End' Participant Structure – Examining How Student Cognitive Factors and Teacher Beliefs Impact Its Contribution to Progressive Discourse
Brett A. Criswell
Scott P. McDonald

Paper 3: The Development of Professional Identity through Participation in a Community of Practice
Oliver Dreon Jr.
Scott P. McDonald

Paper 4: Understanding Professional Vision in Inquiry Science Teaching
Scott P. McDonald

Strand 5: Using the In-Vivo Method to Expose Inquiry-Based Challenges for University Science Students
Room: Essex A
Presider: Cheryl Berg
Paper 1: Challenges to Graduate Student Research in the Historical Based Sciences
Jeff Dodick
Inbal Flash-Gvili

Paper 2: The Doctoral Experiences of Students and Their Advisors in Chemistry and Physics: A Qualitative Examination
Robert H. Tai
Geoff Potvin
John Loehr
Scott S. Lloyd

Paper 3: The Effect of Disciplinary Identity on Interdisciplinary Learning During Scientific Group Meetings
Anat Yarden
Nir Esterman

Paper 4: What Can a Laboratory Study of Chemistry Tell Us About Learning?
Janet Bond-Robinson

Strand 7: Coordinator Organized Paper Set: Preservice Teachers’ Learning and Growth Within Teacher Education Programs
Room: Kent B
Presider: Anita Roychoudhury

Paper 1: Intersection of Teacher and Student ZPDs: Instructional Implications
Anita Roychoudhury

Paper 2: Facets of Effective Science Learning Environment: Preservice Elementary Teachers’ Observations of Their Clinical Experience in Korea and the U.S.
Do-Yong Park
Marilyn Morey
Myon U. Lee

Paper 3: Investigating Teacher Knowledge of Learners and Learning and Sequence of Science Instruction in an Alternative Certification Program
Patrick L. Brown
Sandra K. Abell
Patricia M Friedrichsen

Paper 4: Dual Vision: A Method for Capturing the Learning Journey of Pre-Service Primary Teachers of Science
Christine J. Howitt
Grady J. Venville

Strand 8: Coordinator Organized Paper Set: Impacting Teacher Knowledge, Teaching Practice and Student Learning
Room: Kent C
Presider: Tamara Holmlund Nelson

Paper 1: Urban School Reform Enabled by Transformative Professional Development: Impact on Teacher Change and Student Learning of Science
Carla Johnson
Sherry Marx

Paper 2: Impacting Teacher Knowledge, Teacher Practice, and Student Achievement: The Role of Educative Curriculum Materials and Professional Development
Julie Gess-Newsome
Janet Carlsen Powell
Joseph Taylor
April Gardner

Paper 3: Preparing Teachers to Support Students in Conducting a Field-Based, Technology-Rich Scientific Investigation
Meredith E. Houle
Michael Barnett
Peter Piazza
Eric G. Strauss

Paper 4: Project-Based Science Curricula Impact Minority Students’ Achievement, Attitudes, and Plans Via Teacher Knowledge and Enactment
David Kanter
Kimberly Tester
Jack Gallagher
Spyros Konstantopolous

Strand 10: Coordinator Organized Paper Set: Assessment Development II
Room: Essex C
Presider: Curtis Pike

Paper 1: An Analysis of Field Test Results for Assessment Items Aligned to the Topic of Atoms, Molecules, and States of Matter
Cari F. Herrmann Abell
George DeBoer

Paper 2: The Context Dependency of Students’ Conceptions of Basic Optics Concepts Using a Two-Tier Multiple-Choice Diagnostic Instrument
Hye-Eun Chu
David Treagust
A. L. Chandrasegaran

Paper 3: Development, Implementation, and Evaluation of a New Assessment Instrument for Measuring Student Knowledge of Genetics and Natural Selection
Ross H. Nehm
Alicia Carassco
Mary Driscoll
Tuesday, April 1

Paper 4: Development of a Concept-Inventory-Based Test in Nanoscale Science and Engineering and Its Use at a Professional Development Institute
Alan K. Szeto
Lynn A. Bryan
Nicholas J. Giordano
George M. Bodner
Emily D. Wischow
Shanna R. Daly

Strand 11: Symposium: Sociocultural Studies and Issues Related to Students and Teachers: Believing, Caring, and Performing
Room: Laurel A
Presider: Mary M. Atwater
Mary M. Atwater
Tonjua B. Freeman
Georgia Hodges
Weiling Li
Rhonda Rackley
Regina Suriel

Strand 14: Coordinator Organized Paper Set: Scientific Understanding and Environmental Education
Room: Grand Ballroom Salon II
Presider: Julie Lambert

Paper 1: Facilitating Content Knowledge Through In-depth Examination of Environmental Issues
James T. McDonald

Paper 2: Environmental Educators’ Conceptions of the Nature of Science and the Role of Science in Environmental Education
Teddie Phillipson-Mower

Paper 3: Decisions and Dilemmas: Using WTL Activities to Increase Ecological Literacy
Alison M. Wallace
Meena M. Balgopal

Paper 4: The Development and Implementation of a Modeling-Based Curriculum to Enhance Ecosystems’ Understanding: A Design Experiment With Fifth Graders
Marios N. Papaevripidou
Constantinos Constantinou
Zacharias C. Zacharia

Evening Events

5:00PM – 6:00PM
Research in Science Education (RISE) Editorial Board Meeting
Room: Laurel C

5:45PM – 6:45PM
Membership and Elections Committee-Sponsored New Researcher and Junior Faculty Early Career Discussion
Room: Dover C
Presider: Jim McDonald
Jim McDonald
Catherine M. Koehler

6:30PM
Equity Dinner (off site)
Please meet in the lobby at 6:30pm. All members of NARST are invited and encouraged to attend.

7:00PM – 9:00PM
Routledge/Taylor and Francis Reception (by invitation only)
Room: TBD

8:00PM – 10:00PM
Social—FARSE
Room: Grand Ballroom Salon II
NARST Strand Meetings
7:00AM – 8:15AM

Strand 1 Meeting: Science Learning, Understanding and Conceptual Change
Room: Essex B

Strand 2 Meeting: Science Learning: Contexts, Characteristics and Interactions
Room: Laurel D

Strand 3 Meeting: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies
Room: Grand Ballroom Salon1

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

Strand 5 Meeting: College Science Teaching and Learning (Grades 13-20)
Room: Essex A

Strand 6 Meeting: Science Learning in Informal Contexts
Room: Laurel C

Strand 7 Meeting: Pre-service Science Teacher Education
Room: Kent B

Strand 8 Meeting: In-service Science Teacher Education
Room: Kent C

Strand 9 Meeting: Reflective Practice
Room: Dover B

Strand 10 Meeting: Curriculum, Evaluation, and Assessment
Room: Essex C

Strand 11 Meeting: Cultural, Social, and Gender Issues
Room: Laurel A

Strand 12 Meeting: Educational Technology
Room: Laurel B

Strand 13 Meeting: History, Philosophy, and Sociology of Science
Room: Dover C

Strand 14 Meeting: Environmental Education
Room: Dover A

Session 11
8:30AM – 10:00AM

Equity and Ethics Committee Sponsored Session: Conceptual Frameworks for Research on Diversity in Science Education
Room: Dover A

Presider: Angela Calabrese Barton

Panel Discussants:
Angela Calabrese Barton
Bryan Brown
Pauline Chinn
Jomo Mutegi
Alberto Rodriguez

Strand 1: Coordinator Organized Paper Set: Learning Biological Concepts
Room: Essex B

Presider: Eric N. Wiebe

Paper 1: How Do Domain Specific Learning Stimuli Influence the Students' Self-Explanations While Learning With Worked-Out Examples in Biology?
Iris Mackensen-Friedrichs

Paper 2: Generating Knowledge in Genetics Through a Simulation of a Research in Genetics and Bioinformatics
Hadas Gelbart
Anat Yarden

Paper 3: Students Learn About Their Own Bodies as Part of Their Biological and Citizenship Deduction. How Do They Learn? What Do They Learn First? From Whom Do They Learn?
Ann W. Wright
Sue D. Tunnicliffe
Michael Reiss

Paper 4: Promoting Middle School Student's Understandings of Molecular Genetics
Ravit Golan Duncan
John Ruppert
Andrew Bausch
Hava B. Freidenreich

Strand 2: Coordinator Organized Paper Set: Reform and Practice in Science Education
Room: Laurel D

Presider: Lilian Pozzer-Ardenghi
Paper 1: What is Hindering Reform-Based Teaching: Cultural Constraints or Professional Limitations?
Mehmet Aydeniz

Paper 2: Primary Grade Writers of Scientific Discourse: Two Case Studies From Integrated Science/Literacy Instruction
Sheryl L. Honig

Paper 3: Recent Experimental Studies of Inquiry-Based Teaching: A Meta-Analysis and Review
Erin M. Furtak, Tina Seidel

Eileen C. Parsons, Rhea Miles, Spike Petersen

Strand 2: Coordinator Organized Paper Set: Improving Science Achievement Using Technology and Other Innovative Strategies
Room: Grand Ballroom Salon IV

Presider: Wesley B. Pitts

Paper 1: Improving the Quality of Science Instruction in Primary Schools in Cape Coast in Ghana
Christopher Beccles

Paper 2: Investigating the University Learning Environment, Student Engagement and Satisfaction Among Science Majors
Shwu-yong L. Huang

Paper 3: A Web-Based Science-Technology-Society Program for Gifted Students in South Korea: Development and Implementation
Gilsun Lim, Robert E. Yager

Paper 4: High School Biology Students’ Evolution Learning Experiences
Lisa A. Donnelly, Valarie L. Akerson

Strand 3: Coordinator Organized Paper Set: Primary Science Teachers’ Conceptions and Practice
Room: Grand Ballroom Salon 1

Presider: Terry Shanahan

Paper 1: Experienced Primary Teachers’ and Primary Science Student Teachers’ Collaborative Learning Through Reflection on Their Science Teaching
Pernilla K. Nilsson, Jan H. van Driel

Paper 2: Exploring the Intersection of Writing and Science in Elementary Classrooms
Nicole Glen, Sharon Dotger

Paper 3: Preservice Elementary Teachers’ Ideas about Evolution: Interrelationships with Self-efficacy, College Science Courses, and Science Content Knowledge
Diana C. Rice, Cynthia Lundeen, Sibel Kaya

Paper 4: Egomorphism, a Teacher’s Discursive Pedagogical Artifact in/for Science Education
Bruno D. O. Jayme, Giuliano Reis, Wolff-Michael Roth

Strand 4: Coordinator Organized Paper Set: Students’ Content Knowledge and Personal Epistemologies
Room: Kent A

Presider: Huseyin Colak

Paper 1: The Relationship Between the Development of Nature of Science Views and Personal Epistemologies of Upper Elementary and Middle School Students
Huseyin Colak, Khemjawadee Pongsanon

Paper 2: Classroom Talk Analysis of a Science Teacher Balancing Teaching to the Test and for Conceptual Understandings
Sara L. Salloum, Saouma B. BouJaoude

Paper 3: The Impact of a Kinesthetic Astronomy Curriculum on the Content Knowledge of At-Risk Students
Stephanie J. Slater, Timothy F. Slater, Cherilynn Morrow

Paper 4: Nanoscience Instruction in Physics
Thomas R. Tretter, Gail Jones, Jennifer Wolf

Strand 5: Coordinator Organized Paper Set: Methods of Physics Instruction
Room: Essex A

Presider: Lynn A. Bryan
**Paper 1:** Experimentation with Combined Physical and Virtual Materials: An Attempt to Enhance Undergraduate Students’ Conceptual Understanding in Physics  
Zacharias C. Zacharia  

**Paper 2:** The Development of Conceptual Thinking in Inquiry-Based Physics  
Bruce R. Patton  
Jennifer Esswein  

**Paper 3:** Undergraduate Students’ Reasoning Skills and Conceptual Development in an Inquiry Class  
Omer Acar  
Anita Roychoudhury  
Bruce R. Patton  

**Paper 4:** The Process of Physics TAs’ Knowledge Development for Teaching a New Physics Curriculum  
Eulsun Seung  
Lynn A. Bryan  
Mark Haugan  

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**Strand 6:** Coordinator Organized Paper Set: From Children through Staff -- Learning across Science Centers  
Room: Laurel C  

Presider: Leonie Rennie  

**Paper 1:** What Did You Learn at the Science Centre? Using Video in Stimulated Recall Interviews With Primary School Children  
Jennifer Dewitt  

**Paper 2:** Guided Dialogue at Science Centers  
Nana Quistgaard  

**Paper 3:** Hands-On or Minds-On? Zones of Interaction and Expressions of Curiosity in an Interactive Science Center  
Yael Bamberger  

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**Strand 7:** Coordinator Organized Paper Set: Examining Teacher Education/Certification Programs II  
Room: Kent B  

Presider: Carol Johnston  

**Paper 1:** Prospective STEM Teachers’ Early Schooling Experiences and Exposures as Drivers to Teach in High Needs Schools  
Athena R. Ganchorre  
Debra Tomanek  

**Paper 2:** STEM Career-changers Transition to Teaching: I Have to Become a Student Again?  
Carol Johnston  
Jeannie M. Grier  

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**Strand 8:** Coordinator Organized Paper Set: Teacher Identity and Beliefs  
Room: Kent C  

Presider: Martina Nieswandt  

**Paper 1:** Retention of Urban Science Teachers: Pathways Toward Integration or Participation  
Carol Rinke  

**Paper 2:** Identities in a Community of Practice: The Role of Beginning Science Teachers’ Identities in Becoming a Member of Their School Community and Implementing Science Education Reform  
Yavuz Saka  
Sherry A. Southerland  

**Paper 3:** Between Theory and Practice: Beginning High School Science Teachers’ Beliefs About Science and Science Teaching Over Time  
Martina Nieswandt  

**Paper 4:** Reforming Science Teaching and Learning in Australian Primary Schools: An Innovative, Low Cost and Successful Model  
Mark Hackling  
Vaughan Prain  
Shelley Peers  

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**Strand 8:** Coordinator Organized Paper Set: In-Service Teacher Programs: What Works?  
Room: Dover B  

Presider: Anil Banerjee  

**Paper 1:** An Examination of the Process of Supporting Uncertified Science Teachers: What New Teachers Need to Succeed  
Wendy M. Frazier  
Donna R. Sterling  
Mollianne G. Logerwell
**Paper 2: The Impact of a Five-Year, K-6 Systemic Reform Effort on Elementary School Students' Achievement in Science**
James A. Shymansky
Leonard A. Annetta
Susan A. Everett
Larry Yore

**Paper 3: “I'm Invested in the Outcome”: Professional Development that Matters in the Eyes of Teachers**
Tom J. McConnell
Tianyi Zhang
Meilan Zhang
Mary Lundeberg
Jan Eberhardt

**Strand 9: Coordinator Organized Paper Set: Reflective Practice and Science Teacher Education II**
Room: Laurel B
Presider: Tamara Holmlund Nelson

**Paper 1: Reflective Practice as a Mechanism for Fostering Science Teacher Educators’ Identity Development in an International Context**
Brenda Capobianco

**Paper 2: Students’ Learning about Plants in Elementary Science Methods: Journal Writing and the Uncertainties of Assessment**
Elaine V. Howes

**Paper 3: Making Formative Assessment Discernible to Pre-Service Teachers: A Pragmatic Self-Study**
Gayle A. Buck
Julianne L. Kaftan
Jennifer Nelson

**Strand 10: Coordinator Organized Paper Set: Assessment Development III**
Room: Essex C
Presider: Robert J. Ochsendorf

**Paper 1: Diagnostic Research, Development and Implementation of a New Approach to the Teaching of Chemical Bonding**
Tami Levy Nahum
Rachel Mamlok-Naaman
Avi Hofstein

**Paper 2: A Methodological Framework for Studying Worldviews’ Changes**
Konstantinos Korfiatis
Tasos Hovardas

**Paper 3: Developing a Large Scale Assessment Instrument Measuring Students’ Competencies in Nature of Science and Scientific Inquiry**
Irene Zilker
Gary M. Holliday
Alexander Kauertz
Hans E. Fischer
Judith S. Lederman
Norman G. Lederman

**Paper 4: Argumentation and Conceptual Understanding: Grade 10 Students’ Learning About Genetics**
Vaille M. Dawson
Grady J. Venville

**Strand 11: Symposium: Why Our Students Stay: Strategies for Retention and Teaching of Women of Color in STEM Disciplines**
Room: Laurel A
Presider: Angela Johnson

Angela Johnson
Sybol C. Anderson
Terrell Lasane
Katherine Norlock
Katherine Socha
Linda Coughlin

**Break**
10:00AM – 10:30AM

**Session 12**
10:30AM – 12:00PM

**Research Committee Sponsored Workshop: Considerations and Complexities of Large Scale Studies**
Room: Dover A
Presider: Randy Yerrick
Sharon J. Lynch
Curtis Pike
Mike Vitale
Nancy Butler-Songer
Carol O’Donnell
Randy Yerrick

**Strand 1: Coordinator Organized Paper Set: Students’ Understanding of Scientific and Medical Practice**
Room: Essex B
Presider: Susan A. Yoon
Paper 1: Group Interaction in Hands-On Activities Related to Medical Image Reconstruction
Spartak Kalita
Dean A. Zollman

Paper 2: Translations of Scientific Practice to High School Students’ “Images of Science”
Michiel van Eijck
Pei-Ling Hsu
Wolf-Michael Roth

Strand 2: Related Paper Set: Designing and Testing the MoDeLS Progression
Room: Laurel D
Presider: Eduardo F Mortimer

Paper 1: Designing and Testing the MoDeLS Progression
Christina Schwarz
David Fortus
Jo Ellen Roseman
Barbara Ladewski
Ted Willard
Joe Krajcik

Paper 2: Incorporating Modeling Practices Into Elementary Students’ Scientific Investigations
Lisa Kenyon
Christina Schwarz
Barbara Hug
Hamin Baek
Brandy Buckingham

Paper 3: Incorporating Modeling Practices Into Middle School Project-Based Science
David Fortus
Ayelet Weizman
Yael Shwartz
Joi Merritt
Christina Schwarz

Paper 4: Promoting Preservice Teachers’ Understanding and Use of Scientific Modeling in Teaching and Learning
Barbara Hug
Lisa Kenyon
Elizabeth Davis
Michele Nelson

Paper 5: Progress and Challenges in Making Modeling Practices Meaningful
Brian J. Reiser
Christina Schwarz
Joe Krajcik
Elizabeth Davis

Strand 4: Related Paper Set: Nanoscale Science Education in Grades 7-12: What Do Teachers Need to Know?
Room: Kent A
Presider: Lynn A. Bryan

Paper 1: Middle and High School Teachers’ Emerging Conceptions of Nanoscale Science
Lynn A. Bryan
David Sederberg
Alan Szeto
Shanna Daly
Kelly Hutchinson
Fatima Benaisa
Nick Giordano

Paper 2: Nanoscale Phenomena Models: Middle and High School Teachers’ Conceptions of their Use in Curricula
Shanna Daly
Lynn A. Bryan

Paper 3: Development of a Learning Progression for Students’ Conceptions of Size and Scale
Clara Cahill
Shawn Stevens
Namsso Shin

Paper 4: Emergent Conceptions of Size and Properties in the Context of Nanoscale Science
Cesar Delgado
Namsso Shin
Joseph Krajcik

Paper 5: A Qualitative Analysis of Factors Influencing Students’ Interests in Nanoscale Science
Kelly Hutchinson
George Bodner
Lynn A. Bryan

Strand 5: Symposium: Is Post-Secondary Biological Education Addressing the Evolution/Creation Controversy?
Room: Essex A
Presider: Kimberly D. Tanner

Leslie Sandra Jones
Deborah Allen
Kathleen Fisher
Ellen Granger
Kim Sadler

Strand 7: Coordinator Organized Paper Set: Inquiry Teaching and Learning for Preservice Teachers
Room: Kent B
Presider: Paul Bueno de Mesquita
Paper 1: Prospective Science Teachers’ Construction of Inquiry in the Context of Planning and Teaching Inquiry Based Lessons
Larry Horvath
Cynthia Passmore

Paper 2: Examining the Ability to Construct a 5E Learning Cycle Science Lesson Plan
Richard H. Moyer
Susan A. Everett

Paper 3: Teacher Talk, Science Questions, and Depth of Inquiry of Preservice Elementary Teachers During an Initial Inquiry Science Lesson
Paul Bueno de Mesquita
Betty J. Young
Celeste Bowler
Laurie Center
Cristen Henderson

Paper 4: Use and Quality of Inquiry Pedagogy in the Science Video Lessons of Elementary Preservice Teachers
Betty J. Young
Barbara L. Nowicki
Barbara Fitzsimmons
Kathleen Guglielmi
Judy Paolucci
Sharon K. Lee

Strand 8: Coordinator Organized Paper Set: Attitudes and Perceptions Towards NOS and Inquiry
Room: Kent C

Presider: Catherine Wissehr

Paper 1: “Biology in Context”: Teachers’ Professional Development in Learning Communities
Doris Elster

Paper 2: Investigating the Influence of Teachers’ NOS Conceptions on Their Ability and Willingness to Integrate Inquiry into Their Instruction as Revealed through Online Learning
Hakan Atar
Alejandro Gallard

Paper 3: Middle Level Teacher Reflections on Inquiry and Standards Based Science Instruction
Loran C. Parker
Gerald H. Krockover

Paper 4: Elementary Teachers’ Beliefs and Practical Knowledge About Teaching Science as Inquiry: The Effect of an Inquiry-Based Elementary Science Course
Sanghee Choi
John Ramsey

Strand 10: Coordinator Organized Paper Set: Curriculum Adaptation
Room: Essex C

Presider: Xiufeng Liu

Paper 1: Smaller is Smarter: Technology Enriched Project-Based Inquiry at a Public Urban Academy
Regina E. Toolin

Paper 2: Activities to Promote Student Learning of the Role of Proteins in Modern Genetics
Jennifer Eklund
Nonye Alozie

Paper 3: Qualitative Analysis of Primary Level Students’ Scientific Competencies Working With M(odeling)-Open Problems
Sabine Mogge
Helmut Vogt
Bernd Wollring

Ling L Liang
David Majerich
Richard Clevenstine
Raymond Howanski

NARST Board of Directors Meeting 3
Buffet lunch for Board members starting at 12:00pm
12:30PM – 4:00PM