## Saturday, March 24, 2012

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

**Conference Registration**
2:00pm – 5:00pm, White River Registration

## Sunday, March 25, 2012

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

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

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

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

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

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

## Sunday, March 25, 2012

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

**Lunch—On Your Own**
**12:00pm – 1:00pm**

## Concurrent Session #1
## 1:00pm – 2:30pm

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

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

*Think-aloud Protocol Analysis as a Measure of Students' Science Learning through Design Assessment*
Todd R. Kelley, Purdue University, trkelley@purdue.edu
Brenda M. Capobianco, Purdue University

*Facilitating and Assessing Science Learning Within an Engineering Design-Focused Project-Based Learning Curriculum*
Mike Ryan, Georgia Institute of Technology, mike.ryan@ceismc.gatech.edu
Marion Usselman, Georgia Institute of Technology

## Sunday, March 25, 2012

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

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

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

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

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

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

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

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

## Sunday, March 25, 2012

Ardice Hartry, UC Berkeley

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

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

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

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

*7th Grade Students' Decisions about Limiting Resources after Writing-to-Learn Instruction*
Meena M. Balgopal, Colorado State University, Meena.Balgopal@colostate.edu
Lynn Gilbert, Conrad Ball Middle School
Pam Breitbarth, Conrad Ball Middle School
Alison M. Wallace, Minnesota State University Moorhead

*The Comparison of Image-text Relations in High School Biology Textbooks between Australia and Taiwan*
Yun-Ping Ge, National Changhua University, Taiwanyunpingge@yahoo.com.tw
Len Unsworth, University of New England, Australia
Chang-Hung Chung, National Changhua University, Taiwan
Huey-Por Chang, National Changhua University, Taiwan
Kuo-Hua Wang, National Changhua University, Taiwan

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

*Building a Rationale for the Integration of Systems Models into College-level Biology Teaching and Learning*

## Sunday, March 25, 2012

Tammy M. Long, Michigan State University, longta@msu.edu
Jennifer L. Momsen, North Dakota State University
Elena Bray Speth, Saint Louis University
Joseph T. Dauer, Michigan State University
Sara A. Wyse, Bethel University

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

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

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

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

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

## Sunday, March 25, 2012

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

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

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

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

*Preservice Science Teachers' Use of Inscriptions In Their Peer Teaching Activity*
Arzu Tanis Ozcelik, The Pennsylvania State University, axt252@psu.edu
Scott P. McDonald, The Pennsylvania State University

*Peer-to-Peer Mentoring: Examining the Potential for Communities of Practice in Supporting Teacher Learning*
Amal Ibourk, Michigan State University, ibourkam@msu.edu
Angela Calabrese Barton, Michigan State University
Gail Richmond, Michigan State University

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

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

## Sunday, March 25, 2012

**Strand 8: In-service Science Teacher Education**
***Promoting Language and Literacy in the Science Classroom***
1:00pm – 2:30pm, Room 105
**Presider:** Andrea R. Milner, Adrian College

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

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

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

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

**Strand 8: In-service Science Teacher Education**
***Developing the Pedagogical Knowledge and Practice of Science Teachers***
1:00pm – 2:30pm, Room 106
**Presider:** Andrew W. Shouse, University of Washington

*Professional Development of Secondary Biology Teachers held in an Overseas Country*
Do-Yong Park, Illinois State University College of Education Normal, IL 61790-5330, dpark@ilstu.edu
Jae Young Han, Chungbuk National University, Chungbuk, The Republic of Korea

*An Ethnographic Case Study on Teacher's Involvement in Developing Models of Informal Formative Assessments (IFA) and Understanding the Challenges to Effective Implementations*
Asli Sezen, Towson University, asezen@towson.edu
Gregory J. Kelly, Penn State University

*Utilizing Scientific Habits of Mind as a Framework for Professional Development for Inservice Elementary Teachers*
Kim D. Abegglen, Hockinson Middle School, kin.abegglen@hock.k12.wa.us
Amanda M. Gunning, Teachers College

*Taking on the Challenge of STEM: The Journey of Three Middle School Science Teachers*
Tara B. O'Neil, University of Hawaii, toneill@hawaii.edu

## Sunday, March 25, 2012

Lisa Nishizuka, Waimea Canyon Middle School
Susan Togioka, Waimea Canyon Middle School
Justin Yamagata, Waimea Canyon Middle School

**Strand 9: Reflective Practice**
***Reflective Practice in Professional Development and Teacher Education***
1:00pm – 2:30pm, Room 301
**Presider:** Tom J. McConnell, Ball State University

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

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

*Working Collaboratively with Teacher-researchers to Investigate What Young Children Know and Can Do in Science*
Mary E. Hobbs, University of Texas at Austin, maryhobbs@mail.utexas.edu
Robert A. Williams, University of Texas at Austin
James P. Barufaldi, University of Texas at Austin

*Assessing the Reflective Practice of Prospective Teachers Through Written Reflections*
Geraldine L. Cochran, Florida International University, gcoch001@fiu.edu
Eric Brewe, Florida International University
Laird H. Kramer, Florida International University
David Brookes, Florida International University

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

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

## Sunday, March 25, 2012

Betty Stennett, BSCS

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

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

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

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

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

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

*"It's about Relationships": Girls Imaginings of Science and Self in an Afterschool Program*

## Sunday, March 25, 2012

Allison J. Gonsalves, Universite de Montreal, allison.gonsalves@umontreal.ca
Alice Carvalho, Universite de Montreal
Jrene Rahm, Universite de Montreal

*Factors Influencing Female Students' Participation in a Pre-engineering and Engineering Program*
Mary Kasarda, Associate Professor in Mechanical Engineering, bbrand@vt.edu

**Strand 12: Educational Technology**
***Strand Sponsored Session - Serious Educational Games: Research Experiences from National Science Foundation Funded Projects***
1:00pm – 2:30pm, Room 101
**Presider:** James Minogue, North Carolina State University
**Presenters:**
Leonard A. Annetta, George Mason University, lannetta@gmu.edu
Douglas B. Clark, Vanderbilt University
Diane J. Ketelhut, University of Maryland
Troy D. Sadler, University of Missouri
James Minogue, North Carolina State University

**Strand 13: History, Philosophy, and Sociology of Science**
***Teacher Education in HOS, POS & SOS***
1:00pm – 2:30pm, Room 102
**Presider:** Catherine E. Milne, New York University

*Experiencing Research for Teaching Science [ExpeRTS]: Tracking Changes in Future Secondary Science Teachers' Conceptions of Nature of Science, Scientific Inquiry, and Inquiry Science Teaching*
Renee S. Schwartz, Western Michigan University, r.schwartz@wmich.edu
Cathy K. Northcutt, Western Michigan University
Susan Stapleton, Western Michigan University

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

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

## Sunday, March 25, 2012

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

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

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

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

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

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

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

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

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

## Sunday, March 25, 2012

*When Science is High Stakes: Variations among the States and the Effects on Reading and Math*
Eugene Judson, Arizona State University, Eugene.Judson@asu.edu

## Sunday, March 25, 2012

## Concurrent Session #2
## 2:45pm – 4:00pm

**Awards Committee Sponsored Session**
***Distinguished Contributions in Research***
2:45pm – 4:00pm, Room 313
**Presenters:**
Xiufeng Liu, State University of New York at Buffalo, xliu5@buffalo.edu
Norman G. Lederman, Illinois Institute of Technology

**Strand 1: Science Learning, Understanding and Conceptual Change**
***Related Paper Set - Supporting Argumentation, Explanation, and Modeling Practices in Elementary and Middle School Classrooms***
2:45pm – 4:00pm, Room 310
**Presider:** Brian J. Reiser, Learning Sciences, Northwestern University
**Discussant:** Cynthia Passmore, University of California-Davis

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

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

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

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

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

## Sunday, March 25, 2012

**Strand 2: Science Learning: Contexts, Characteristics and Interactions**
***Related Paper Set - Connecting Expansive Framing to Transfer in a High School Biology Classroom***
2:45pm – 4:00pm, Room 302
**Discussants:**
Maria Varelas, University of Illinois at Chicago
N. Sanjay Rebello, Kansas State University

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

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

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

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

**Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies**
***The Nature of Science in Elementary School Classrooms***
2:45pm – 4:00pm, Room 301
**Presider:** Lloyd H. Barrow, University of Missouri

*How do Elementary School Science Textbooks Present the Nature of Science?*
Marianne Phillips, Texas A&M University, San Antonio, marianne.phillps@tamusa.tamus.edu
Julie Vowell, Texas Wesleyan University
Young H. Lee, University of Houston
Brian Plankis, Indiana University

*Using History of Science to Teach the Nature of Science to Elementary School Students*
Khadija Fouad, Indiana University, kfouad@indiana.edu
Heidi L. Wiebke, Indiana University
Valarie L. Akerson, Indiana University

*The Portrayal of the Nature of Science in Early Childhood Physical Science Instructional Materials*
Brandon Schrauth, Johnston Community School District, brandon.schrauth@johnston.k12.ia.us

Joanne K. Olson, Iowa State University

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

*Examining the Challenges and Successes of an Accelerated Science and Math Program for High Potential Urban Middle School Students*
Toni A. Sondergeld, Bowling Green State University, tonis519@aol.com
Andrea R. Milner, Adrian College
Laurence J. Coleman, University of Toledo

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

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

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

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

**Strand 5: College Science Teaching and Learning (Grades 13-20)**
***Constructivism in Science Learning***
2:45pm – 4:00pm, Room 304
**Presider:** Yehudit Judy Dori, Technion-Israel Institute of Technology

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

## Sunday, March 25, 2012

Sharyn K. Freyermuth, University of Missouri-Columbia

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

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

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

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

*Nature of Science Knowledge and Scientific Argumentation Skills in Taiwanese College Biology Students*
MeiChun Lai, The Ohio State University, lai.146@osu.edu
Karen E. Irving, The Ohio State University

*Understanding the Nature of Science and Nonscientific Modes of Thinking in Gateway Science Courses*
Calvin Kalman, Concordia University, Calvin.Kalman@concordia.ca
Marina Milner-Bolotin, University of British Columbia
Tetyana Antimirova, Ryerson University,Toronto
Mark W. Aulls, McGill University
Da-Min Meng, Hefei University of Technology
Elizabeth S. Charles, Dawson College Montreal
Xiang Huang, Concordia University Montreal
Ahmed Ibrahim, McGill University Montreal
Gyoungho Lee, Seoul National University
Xihui Wang, McGill University Montreal

*Improving Student Learning Outcomes by Using Differentiated Activities*
Muhsin Menekse, Arizona State University, muhsin@asu.edu
Michelene Chi, Arizona State University

## Sunday, March 25, 2012

**Strand 6: Science Learning in Informal Contexts**
***Strand Sponsored Session-Current Trends and Directions in Research about Learning and Teaching in Informal Contexts***
2:45pm – 4:00pm, Room 305
**Discussant:** Sandra T. Martell, National Science Foundation, smartell@uwm.edu
**Presenters:**
Jennifer DeWitt, King's College London
Preeti Gupta, New York Hall of Science
David E. Kanter, New York Hall of Science
Leonie J. Rennie, Curtin University, Western Australia
Monya Ruffin, National Science Foundation

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

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

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

*Enhancing Pre-service Science Teachers' Perceived Self-efficacy about Argumentation through Modeling and Mastery Experiences*
Feral Ogan-Bekiroglu, Marmara University, feralogan@yahoo.com
Mehmet Aydeniz, The University of Tennessee

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

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

*Refining Inquiry Based Science Instruction Through Professional Development Using the VISTA Model*
Anne Mannarino, College of William and Mary, amannarino@wm.edu

## Sunday, March 25, 2012

Mollianne G. Logerwell, George Mason University
Victoria Reid, College of William and Mary
Elizabeth Edmondson, Virginia Commonwealth University

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

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

*Virginia Science Education at the Crossroads: Connecting Science Education Faculty to a Professional Community*
Jacqueline Theresa Mcdonnough, Virginia Commonwealth University, jtmcdonnough@vcu.edu
Donna R. Sterling, George Mason University
Juanita Jo Matkins, College of William and Mary
Wendy M. Frazier, George Mason University

*Outcomes of the Virginia Initiative for Science Teaching and Achievement (VISTA) Professional Development*
Jennifer Maeng, University of Virginia, jlc7d@virginia.edu
Randy L. Bell, University of Virginia

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

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

*Relationship, Time and Instructional Focus: Maximizing the Effects of Science Coaching*
Ruth A. Anderson, FACET Innovations, LLC, randerson@facetinnovations.com

## Sunday, March 25, 2012

Jim Minstrell, FACET Innovations
Sue Feldman, Education Service District 112, Washington State

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

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

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

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

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

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

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

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

*Discourses of Nature and Culture of Science: A Sociocultural Study with Canadian and Indian Teachers*
Anjali A. Abraham, McGill University, anjali_abraham@hotmail.com

## Sunday, March 25, 2012

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

*Mother Tongue Policy and Science Teaching in Nigeria : A Conflict Between Policy Provision and Reality*
Peter A. Okebukola, Lagos State University, Lagos, Nigeria, pokebukola@yahoo.com
Tunde Owolabi, Lagos State University, Lagos, Nigeria
Foluso O. Okebukola, Lagos State University, Lagos, Nigeria

**Strand 12: Educational Technology**
***Biotechnology, Genetics & DNA Sequencing through Technology***
2:45pm – 4:00pm, Room 101
**Presider:** Eva Erdosne Toth, West Virginia University

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

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

**Strand 13: History, Philosophy, and Sociology of Science**
***Socioscientific Issues & Argumentation***
2:45pm – 4:00pm, Room 102
**Presider:** Jonathan F. Osborne, Stanford University

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

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

## Sunday, March 25, 2012

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

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

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

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

*Sustainability through the Lens of Earth Education: Children's Ecological Understandings and Environmental Attitudes*
Constantinos C. Manoli, Universtiy of Cyprus, MANOLI@UCY.AC.CY
Bruce Johnson, University of Arizona
Andreas Ch Hadjichambis, Cyprus Centre for Environmental Research and Education
Demetra Hadjichambi, University of Cyprus
¥iannis Georgiou, Cyprus Centre for Environmental Research and Education
Hara Ioannou, Cyprus Centre for Environmental Research and Education

*Lessons from the Tree: How the Tree that Owns Itself Taught its Town*
Debra B. Mitchell, University of Georgia, dbmitchl@uga.edu
Rachel Luther, University of Georgia
Michael Mueller, University of Georgia

**Strand 15: Policy**
***Symposium - Globalization and Science Instruction***
2:45pm – 4:00pm, Room 104
**Presider:** Mei-Hung Chiu, National Taiwan Normal University, Taipei, Taiwan
**Discussant:** Peter W. Hewson, University of Wisconsin, Madison, USA
**Presenters:**
Reinders H. Duit, IPN - Leibniz Institute for Science and Math Education, Kiel, Germany
John L. Bencze, OISE - University of Toranto, Canada
Lyn Carter, Australian Catholic University, Melbourne, Australia
Kyunghee Choi, EWHA Womans University Seoul, South Korea

## Sunday, March 25, 2012

Hyunju Lee, EWHA Womans University, Seoul, South Korea
Sonya N. Martin, Drexel University, Philadelphia, USA
Christina Siry, University of Luxembourg, Luxembourg
Sung-Won Kim, EWHA Womans University Seoul, South Korea
Peter W. Hewson, University of Wisconsin, Madison, USA

## Break
## 4:00pm – 4:30pm, Foyer – White River Ballroom

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

## Evening/Social Events

**Membership and Elections Committee Sponsored Session**
***Mentor-Mentee Nexus***
Informal discussion: Early career NARST members are matched with more seasoned members to help launch or expand professional networks.
6:00pm – 7:00pm, Room 101
**Presiders:**
Corinne Lardy, San Diego State University, corinne_lardy@yahoo.com
Mike U. Smith, Mercer University

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

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

## Monday, March 26, 2012

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

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

## Committee Meetings
## 7:30am – 8:15am

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

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

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

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

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

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

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

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

## Monday, March 26, 2012

## Concurrent Session #3
## 8:30am – 10:00am

**External Policy Committee & Strand 15: Policy Sponsored Session**
***Symposium - Session 1: Next Generation Science Standards: Tracking the Federal Research Agenda***
8:30am – 10:00am, Room 104
**Presiders:**
Andrew Shouse, University of Washington
Christopher Wilson, BSCS
**Presenters:**
Martin Storksdieck, NRC Board of Science Education
Philip L. Bell, University of Washington
Elizabeth A. Davis, University of Michigan
Deborah C. Smith, Pennsylvania State University

**Publications Advisory Committee Sponsored Session**
***Symposium - Discussion with the Editors of Various Science Education Journals***
8:30am – 10:00am, Room 103
**Presiders:**
Carolyn S. Wallace, Indiana State University
Jan H. Van Driel, ICLON Leiden University Graduate school of Teaching, The Netherlands

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

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

*Students' Learning Performance and its Relation to Teaching Practice*
Li Zhan, Michigan State University, zhanli@msu.edu
Dante Cisterna, Michigan State University
Charles W. Anderson, Michigan State University

*Developing and Validating Scoring Procedures for Students' Written Accounts of Carbon-transforming Processes*
Jennifer H. Doherty, Michigan State University, dohertyjh@gmail.com
Karen Draney, University of California, Berkeley

## Monday, March 26, 2012

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

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

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

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

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

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

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

**Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies**
***The Language of Science***
8:30am – 10:00am, Room 301
**Presider:** Josephine Shireen Desouza, Ball State University

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

## Monday, March 26, 2012

*Better Science Learning through Imagery*
Marisa T. Cohen, St. Francis College, MarisaTCohen@gmail.com

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

**Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies**
***Symposium - Global Warming Climate Change: Perspectives on Student Learning and Adaptation of Instructional Materials***
8:30am – 10:00am, Room 313
**Presider:** J. Randy McGinnis, University of Maryland
**Presenters:**
Anita Roychoudhury, Purdue University, aroychou@purdue.edu
Daniel Shepardson, Purdue University
Bruce Patton, The Ohio State University
Melissa George, Tecumseh Junior Hight School
Susie Burton, Tecumseh Junior High School
Joel Wilson, Frankfort Middle School
Nicole Goodwine, Benton Middle School

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

*Mapping Model to Argument -based Inquiry as an Approach to Support Middle School Teachers in Teaching Climate, Weather, and Energy Topics*
Morgan B. Yarker, University of Iowa, morgan-e-brown@uiowa.edu
Charles O. Stanier, University of Iowa
Cory T. Forbes, University of Iowa
Soonhye Park, University of Iowa

*Using Laboratory Activities that Emphasize Argumentation and Argument to Help High School Students Learn how to Engage in Scientific Inwuiry and Understand the Nature of Scientific Inquiry*
Victor D. Sampson, Florida State University, vsampson@fsu.edu
Jonathon Grooms, Florida State University
Patrick J. Enderle, Florida State University
Sherry A. Southerland, Florida State University

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

## Monday, March 26, 2012

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

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

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

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

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

**Strand 5: College Science Teaching and Learning (Grades 13-20)**
***Students' Reasoning and Science Learning***
8:30am – 10:00am, Room 309
**Presider:** Janell Nicole Catlin, Teachers College, Columbia University

*Students' Reasoning and the Level of Interactivity in Science Content Courses for Future Elementary Teachers*
Dean A. Zollman, Kansas State University, dzollman@phys.ksu.edu
Mojgan Matloob-Haghanikar, Winona State University
Sytil Murphy, Shepherd University

*Exploring the Role of Non-Adaptive Reasoning in Students' Evolutionary Explanations*
Elizabeth P. Beggrow, The Ohio State University, beggrow.7@osu.edu
Ross H. Nehm, The Ohio State University

## Monday, March 26, 2012

*The Development and Validation of Critical Thinking, Multiple Choice Items for Introductory College Biology*
Lauren J. Ivans, University of Georgia, LJIvans@uga.edu
Julie M. Kittleson, University of Georgia

*Correcting Misconceptions in an Introductory Biology Course*
Camille E. Naaktgeboren, College of Southern Nevada, Microbiology Instructor, Camille.Naaktgeboren@csn.edu
Barbara A. Austin, Wittenberg University

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

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

*Characterizing Farmworker Pesticide Educators in a Southeastern State: An Examination of Informal Science Educators' Beliefs about Teaching, Pesticides, and Self*
Catherine E. LePrevost, North Carolina State University, celeprev@ncsu.edu
Margaret R. Blanchard, North Carolina State University
Gregory Cope, North Carolina State University

*Experience, Capacity and Identity: Understanding Teachers at the Boundary between Schools and Informal Science Institutions*
James F. Kisiel, California State University, Long Beach, jkisiel@csulb.edu

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

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

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

## Monday, March 26, 2012

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

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

**Strand 8: In-service Science Teacher Education**
***Related Paper Set - Supporting and Retaining High Quality Secondary Science Teachers: Evidence from the Knowles Science Teaching Foundation***
8:30am – 10:00am, Room 105
**Presider:** Nicole Gillespie, Knowles Science Teaching Foundation
**Discussant:** Mark St. John, Inverness Research

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

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

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

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

## Monday, March 26, 2012

**Strand 8: In-service Science Teacher Education**
***Promoting the Teaching of Inquiry***
8:30am – 10:00am, Room 106
**Presider:** Carol L. Stuessy, Texas A&M University

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

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

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

*A Teacher Professional Development Model Focused on Authentic Science Practices in the Classroom*
Barbara A. Crawford, Cornell University, bac45@cornell.edu
Daniel K. Capps, The University of Maine
Maya Patel, Ithaca College
Xenia S. Meyer, University of California, Berkeley
Robert Ross, The Paleontological Research Institution

**Strand 10: Curriculum, Evaluation, and Assessment**
***Strand Sponsored Symposium - New Generation of Science Curriculum and Assessment: International Perspectives***
8:30am – 10:00am, Room 308
**Presider:** Ling L. Liang, LaSalle University, USA
**Presenters:**
Gavin W. Fulmer, National Science Foundation, USA
Michael J. Reiss, Institute of Education, University of London, UK
Lingbiao Gao, South China Normal University, China
Larry D. Yore, University of Victoria, Canada
Joseph S. Krajcik, University of Michigan, USA

## Monday, March 26, 2012

**Strand 11: Cultural, Social, and Gender Issues**
***Cultural and Linguistic Diversity: Implications for Career Choices and Classroom Learning***
8:30am – 10:00am, Room 107
**Presider:** Christina Siry, University of Luxembourg

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

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

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

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

**Strand 12: Educational Technology**
***Cognitive Reasoning with Technology***
8:30am – 10:00am, Room 101
**Presider:** Barbara C. Buckley, WestEd

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

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

*Avatar Attributes and a Third Space: Supporting Positive Affect in Learning Science through Virtual Digital Assistants*
Eric N. Wiebe, North Carolina State University, eric_wiebe@ncsu.edu

## Monday, March 26, 2012

Jennifer London, North Carolina State University
Gail M. Jones, North Carolina State University
John Bedward, North Carolina State University

**Strand 13: History, Philosophy, and Sociology of Science**
***Chemistry Education***
8:30am – 10:00am, Room 102
**Presider:** Linda Keen-Rocha

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

*Midgley, Tetraethyl Lead and CFCs: A Historical Case Study for Chemical Education*
Paulo A. Porto, Instituto de Química - Universidade de São Paulo (Brasil), palporto@iq.usp.br
Hélio E. B. Viana, Universidade Federal da Bahia (Brasil)

*How Chemistry Works? Reflections on Triadic Approaches and a Contribution From Peircean Semiotics*
Karina A.F.D Souza, Instituto Federal de São Paulo, karina_souza@ifsp.edu.br
Paulo A. Porto, Instituto de Química - Universidade de São Paulo

*The Role of 5E Learning Cycle Model on Students' Conceptual Understanding of Solubility Equilibrium Concepts*
Nurdane Aydemir,nurdaneyazici@gmail.com
Omer Geban
Murat Aydemir

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

**Equity and Ethics Committee Sponsored Session**
***Re-Imagining Our Research by Using New Theoretical Frameworks in Science Education***
10:15am – 11:45am, Room 313
**Presiders:**
Felicia M. Mensah, Teachers College, Columbia University
Julie A. Bianchini, University of California, Santa Barbara
**Presenters:**
Heidi Carlone, University of North Carolina-Greensboro
Pauline Chinn, University of Hawaii-Manoa
Alberto J. Rodriguez, San Diego State University
Randy Yerrick, University of New York-Buffalo

## Monday, March 26, 2012

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

**External Policy Committee & Strand 15: Policy Sponsored Session**
***Session 2: Opting In: State Education Agencies and the Next Generation Science Standards***
10:15am – 11:45am, Room 104
**Presiders:**
Andrew W. Shouse, University of Washington
Christopher Wilson, BSCS
**Presenters:**
Tom Keller, National Research Council
Stephen Pruitt, Achieve
Peter McLaren, Rhode Island Department of Education

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

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

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

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

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

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

## Monday, March 26, 2012

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

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

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

*For whom is Argument and Explanation a Necessary Distinction?*
Leema Berland, University of Texas, Austin, leema.berland@mail.utexas.edu
Katherine L. McNeill, Boston College

**Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies**
***Language and Literacy in the Elementary Classroom***
10:15am – 11:45am, Room 301
**Presider:** Sarah J. Carrier, North Carolina State University

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

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

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

## Monday, March 26, 2012

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

*Exploring Teachers' Pedagogical Content Knowledge in Formative Assessment Conversations*
Kristin Mayer, Michigan State University, kristi.mayer@gmail.com
Alicia C. Alonzo, Michigan State University

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

*Exploring Teachers' Pedagogical Content Knowledge Elicited with Video Clips from Their Own Classroom Instruction*
Jiwon Kim, Michigan State University, kimjiwo1@msu.edu
Alicia C. Alonzo, Michigan State University

*Exploring Teachers' Pedagogical Content Knowledge Elicited with Video Clips Focused on Student Thinking*
Alicia C. Alonzo, Michigan State University, alonzo@msu.edu
Jiwon Kim, Michigan State University

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

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

*Undergraduate Biology Students' Conceptions of the Term 'Animal'*
Andrea Bierma, Western Michigan University, andrea.m.kryger@wmich.edu
Renee S. Schwartz, Western Michigan University

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

## Monday, March 26, 2012

Sarah Robert, NC State University
Kayla Poland, NC State University

*College Freshmen Students' Conceptions of Natural Selection and Evolution*
Mustafa B. Aktan, Hacettepe University, mbaktan@hacettepe.edu.tr

**Strand 5: College Science Teaching and Learning (Grades 13-20)**
***Learning through Experiences***
10:15am – 11:45am, Room 309
**Presider:** Geoff Potvin, Clemson University

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

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

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

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

**Strand 6: Science Learning in Informal Contexts**
***Related Paper Set - Designing for Science Learning: Accounting for the Role for Families and Parents in Supporting Youth***
10:15am – 11:45am, Room 305
**Presider:** Heather Toomey Zimmerman, Pennsylvania State University
**Discussant:** Lynn D. Dierking, Oregon State University

*Understanding How Families use Observational Tools during Nature Center Hikes*
Heather Toomey Zimmerman, Pennsylvania State University, heather@psu.edu

## Monday, March 26, 2012

Lucy R. McClain, Penn State University
Michele Crowl, Pennsylvania State University
Lynn D. Dierking, Oregon State University

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

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

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

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

**Strand 7: Pre-service Science Teacher Education**
***Elementary Science Teacher Preparation I***
10:15am – 11:45am, Room 306
**Presider:** Gail L. Dickinson, Texas State University

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

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

*Learning to Support Elementary Students' Scientific Reasoning: Preservice Elementary Teachers and the Evidence-Explanation Continuum*
Laura Zangori, University of Iowa, laura-zangori@uiowa.edu
Cory T. Forbes, University of Iowa
Mandy Biggers, University of Iowa

*Pre-service Elementary Teachers' Learning to Integrate Science and Language Instruction for Linguistically Diverse Students*
Youngjin Song, University of Northern Colorado, youngjin.song@unco.edu

Elizabeth Franklin, University of Northern Colorado
Teresa Higgins, University of Northern Colorado

**Strand 8: In-service Science Teacher Education**
***Development and Characteristics of Science Teacher Leaders***
10:15am – 11:45am, Room 105
**Presider:** Jodie Galosy, Knowles Science Teaching Foundation

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

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

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

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

**Strand 8: In-service Science Teacher Education**
***Research Experiences for Science Teachers***
10:15am – 11:45am, Room 106
**Presider:** Donna R. Sterling, George Mason University

*When are Teachers Prepared to Implement Reform Science Practices?*
Katrina Roseler, Florida State University, kr09e@my.fsu.edu
Giang Nguyen

## Monday, March 26, 2012

Barry Golden, University of Tennessee

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

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

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

**Strand 10: Curriculum, Evaluation, and Assessment**
***Curriculum and Implementation***
10:15am – 11:45am, Room 308
**Presider:** Mary M. Atwater, The University of Georgia

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

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

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

*Connecting Curriculum Materials and Teachers: Elementary Science Teachers' Enactment of a Reform-based Curricular Unit*
Amber M. Schultz, University of Michigan, aschul@umich.edu
Anna Maria Arias, University of Michigan
Elizabeth A. Davis, University of Michigan
Annemarie S. Palincsar, University of Michigan

## Monday, March 26, 2012

**Strand 11: Cultural, Social, and Gender Issues**
***Urban Children and Science: Identity, Representation, and Implications for Science Education***
10:15am – 11:45am, Room 107
**Presider:** Gale A. Seiler, McGill University

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

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

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

*Students Awareness and Varied Use of Classroom as Social Construct*
Adriane M. Slaton,slatonad@msu.edu

**Strand 12: Educational Technology**
***Games, Simulations, Virtual Environments, & GIS***
10:15am – 11:45am, Room 101
**Presider:** Karen E. Irving, The Ohio State University

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

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

*Immersing Preservice Science Teachers in Serious Educational Games*
Leonard A. Annetta, George Mason University, lannetta@gmu.edu
Richard L. Lamb, George Mason University
James Minogue, North Carolina State University
Rebecca Cheng, George Mason University

## Monday, March 26, 2012

David B. Vallett, George Mason University
Shawn Y. Holmes, North Carolina State University
Elizabeth Folta, College of Environmental Science & Forestry

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

**Strand 13: History, Philosophy, and Sociology of Science**
***Strand Sponsored Session - Teaching and Assessment of Inquiry and Nature of Science with Early Childhood Students***
10:15am – 11:45am, Room 102
**Presider:** Norman G. Lederman, Illinois Institute of Technology
**Presenters:**
Valarie L. Akerson, Indiana University
Judith S. Lederman, Illinois Institute of technology
Leon Walls, University of Vermont
Gayle A. Buck, Indiana University
Erin Peter Burton, George Mason University

**Strand 14: Environmental Education**
***Science Teacher Education as a Context for Environmental Literacy Improvement***
10:15am – 11:45am, Room 103
**Presider:** Bryan H. Nichols, University of South Florida

*Conceptualizing In-service Secondary School Science Teachers' Knowledge Base for Climate Change Content*
Devarati Bhattacharya, University of Minnesota, Minneapolis, devarati@umn.edu
Engin Karahan, University of Minnesota, Minneapolis
Younkyeong Nam, University of Minnesota, Minneapolis
Jeremy Wang, University of Minnesota, Minneapolis
Shiyu Liu, University of Minnesota, Minneapolis
Benjamin Tierney, University of Minnesota, Minneapolis
Keisha Varma, University of Minnesota
Gillian Roehrig, University of Minnesota

*Pre-service Elementary Teachers' Outdoor Experiences: How Do These Translate into Beliefs on Taking Students Outdoors?*
Erica N. Blatt, College of Staten Island, CUNY, erica.blatt@csi.cuny.edu

## Monday, March 26, 2012

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

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

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

## Concurrent Session #5
## 1:15pm – 2:45pm

**Equity and Ethics Committee Sponsored Session**
***Symposium - Developing a NARST Code of Ethics***
1:15pm – 2:45pm, Room 103
**Presenters:**
Sarah Barrett, York University, sbarrett@edu.yorku.ca
Julie A. Bianchini, University of California, Santa Barbara
Brian S. Fortney, University of Texas at Austin
J. Randy McGinnis, University of Maryland
Felicia M. Mensah, Teachers College, Columbia University
Matthew Weinstein, University of Washington, Tacoma

**International Committee Sponsored Session**
***Symposium - Contributions from the European Science Education Research Association: Addressing Diversity in Science Education through Research about Cultural Diversity of Students, Brain-type and Motivation, Multiple Workplace Policies and Multiple Representations***
1:15pm – 2:45pm, Room 313
**Presiders:**
Sibel Erduran, University of Bristol
Manuela Welzel-Breuer, ESERA, Germany

## Monday, March 26, 2012

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

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

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

*Representational Competence and Understanding of Scientific Experiments, Phenomena and Concepts: At a Crossroad of Progress for the Science Education of the 21st Century*
Jochen Scheid, University of Landau, Germany,
Rosa Hettmannsperger, University of Landau, Germany
Jochen Kuhn, University of Landau, Germany
Wolfgang Schnotz, University of Landau, Germany
Andreas Müller, University of Geneva, Switzerland

**Strand 1: Science Learning, Understanding and Conceptual Change**
***Related Paper Set - Immersion into Argument-based Inquiry: Understanding Critical Elements for Classroom Practice***
1:15pm – 2:45pm, Room 310
**Discussants:** Brian M. Hand, University of Iowa

*The Effect of the SWH Implementation in Turkish School System: Results from a Scale up Research Project*

## Monday, March 26, 2012

Murat Gunel, AHT Euran University, mgunel@yahoo.com
Recai Akkus, Abant Izzet Baysal University, Turkey
Melike Ozer-Keskin, Gazi University, Turkey
Nilay Keskin-Samanci, Gazi University, Turkey

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

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

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

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

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

*Conceptualize, Contact, Collect, Connect: Using Mixed Methods to Characterize the High School Science Teacher Professional Culture*
Todd D. Bozeman, Texas A&M University, dbozeman71@tamu.edu
Carol L. Stuessy, Texas A&M University
Caroline V. Rosado, Texas A&M University
Tyrone Blocker, Texas A&M University

*Recruit, Induct, Engage, Renew: School Support in a Healthy High School Science Teacher Professional Culture*
Ra'sheedah Richardson, Texas A&M University, sheedah@tamu.edu
Laura E. Ruebush, Texas A&M University
Toni Ivey, Oklahoma State University

## Monday, March 26, 2012

*Activity, Job Satisfaction, Mobility: Teachers as Contributors and Consumers of the Science Teacher Professional Continuum*
Sara E. Spikes, Texas A&M University, sspikes@tamu.edu
Todd D. Bozeman, Texas A&M University

*Achievement Gap: Working Conditions and Science Teacher Professional Culture in Low- and High-Achieving Schools*
Carol L. Stuessy, Texas A&M University, c-stuessy@tamu.edu
Victoria Hollas, Texas A&M University

*Implications for Higher Education and the Preparation of High School Science Teachers*
Timothy Scott, Texas A&M University, tim@science.tamu.edu

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

*Dichotomous Inquiry Practices: Characterizing Teaching Practice based on Essential Features of Inquiry*
Brian R. Pinney, University of Iowa, brian-pinney@uiowa.edu
ChingMei Tseng, University of Iowa
Jee Kyung Suh, University of Iowa
Cory T. Forbes, University of Iowa
Mandy Biggers, University of Iowa
Laura Zangori, University of Iowa

*Characteristics of Scientifically-oriented Questions and the Nature of Inquiry in Elementary Classrooms: A Multiple-case Study*
Claudia P. Aguirre-Mendez, The University of Iowa, claudiapatricia-aguirre-mendez@uiowa.edu
Nattida Promyod, University of Iowa
Cory T. Forbes, University of Iowa
Mandy Biggers, University of Iowa
Laura Zangori, University of Iowa

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

## Monday, March 26, 2012

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

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

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

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

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

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

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

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

## Monday, March 26, 2012

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

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

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

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

*Faculty Development via Sharing and Documenting Course Activities for Flexible Adoption/Adaptation across Multiple Institutions*
Dedra N. Demaree, Oregon State University, demareed@physics.oregonstate.edu
Sissi L. Li, Oregon State Univeristy
Nam-Hwa Kang, Oregon State University
Dennis Gilbert, Lane Community College
Gregory Mulder, Linn-Benton Community College
Corinne Manogue, Oregon State University

*Developing the Grass-Roots Choir: STEM Faculty Agency In Undergraduate Reform*
Jana Bouwma-Gearhart, Assistant Professor, STEM Education, University of Kentucky, jlbo226@uky.edu

*Constructing College Chemistry Instructors' Worldviews*
Mary Chang,mkhchang@hawaii.edu

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

## Monday, March 26, 2012

**Strand 6: Science Learning in Informal Contexts**
***Tools and Technologies Facilitating Informal Learning***
1:15pm – 2:45pm, Room 305
**Presider:** Leonie J. Rennie, Curtin University of Technology

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

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

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

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

**Strand 7: Pre-service Science Teacher Education**
***Elementary Science Teacher Preparation II***
1:15pm – 2:45pm, Room 306
**Presider:** Josephine Shireen Desouza, Ball State University

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

*Re-thinking Early Field Experiences For the Purpose of Preparing Elementary Preservice Teachers Pedagogical Content Knowledge*
Vanashri Nargund-Joshi, Indiana University, Bloomington, VNARGUND@INDIANA.EDU
Meredith A. Park Rogers, Indiana University
Heidi L. Wiebke, Indiana University, Bloomington

Valarie L. Akerson, Indiana University

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

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

**Strand 8: In-service Science Teacher Education**
***Models for Promoting Teacher Learning***
1:15pm – 2:45pm, Room 105
**Presider:** Tamara H. Nelson, Washington State University Vancouver

*Teacher-learning Processes During Professional Development: Conceptual Change and Metacognitive Analyses*
Hedi B. Lauffer, University of Wisconsin-Madison, hfbaxter@wisc.edu
Peter W. Hewson, University of Wisconsin-Madison

*Perspectives on Teaching and Learning to Teach from Students and Teachers in a Teacher-Developed Situated PD Model*
Rachel Ruggirello, Washington University in St. Louis, ruggirello@wustl.edu
Phyllis Balcerzak, Washington University
Vicki May, Washington University in St. Louis
Jill Mcnew, Washington University

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

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

## Monday, March 26, 2012

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

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

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

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

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

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

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

*The AUI: A Valid Instrument to Measure High School Students' Knowledge of Flu Transmission and Management*
William L. Romine, University of Missouri, romine.william@gmail.com
Lloyd H. Barrow, University of Missouri
William R. Folk, University of Missouri

## Monday, March 26, 2012

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

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

*How Did They Do It? Career and Family Together Among Successful Women Science Educators in Both Formal and Informal Settings*
Phyllis Katz, University of Maryland, pkatz15@gmail.com

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

*Female Physicist Doctoral Experiences and Career Choice Factors*
Katherine P. Dabney, University Of Virginia, kd3c@virginia.edu
Vanessa Wyss, Ball State University
Robert H. Tai, University of Virginia

*African American Female Faculty Members: Factors Influencing their Recruitment, Retention and Promotion at Traditionally White Institutions*
Natasha Johnson, The University of Georgia Athens, GA, yjohnson@uga.edu
Mary M. Atwater, The University of Georgia
Malcolm B. Butler, University of South Florida, St Petersburg
Eileen C. Parsons, University of North Carolina at Chapel Hill
Tonjua B. Freeman, The University Of Georgia

**Strand 12: Educational Technology**
***Transforming Teaching with Technology***
1:15pm – 2:45pm, Room 101
**Presider:** Janell Nicole Catlin, Teachers College, Columbia University

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

## Monday, March 26, 2012

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

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

**Strand 13: History, Philosophy, and Sociology of Science**
***Standards in the History, Philosophy & Sociology of Science***
1:15pm – 2:45pm, Room 102
**Presider:** Catherine E. Milne, New York University

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

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

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

**Strand 15: Policy**
***Curriculum Development***
1:15pm – 2:45pm, Room 104
**Presider:** Michelle P. Cook, Clemson University

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

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

## Monday, March 26, 2012

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

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

*Re-imagining Nature of Science: Implications for Policy and Research*
Zoubeida R. Dagher, University of Delaware, zoubeida@udel.edu

## Break
## 2:45pm – 3:15pm, Griffin Exhibit Hall

## Monday, March 26, 2012

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

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

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

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

**A3.** *What Can the Matter Be? Introducing Problematizing, a Strategy to Engender Inquiry in Chemistry Learning*
Catherine E. Milne, New York University, cem4@nyu.edu
Jan Plass, New York University
Bruce Homer, Graduate Center, City University of New York
Trace Jordan, New York University
Ruth Schwartz, New York University
Dixie Ching, New York University
Mubina Kahn, New York University
Yolanta Kornack, Graduate Center, City University of New York
Anna G. Brady, New York University

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

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

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

## Monday, March 26, 2012

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

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

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

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

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

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

**A21.** *Authentic vs. Vicarious: An Analysis of Environmental Education in Different Learning Contexts*
Jeffrey Nordine, Trinity University, jnordine@trinity.edu
Courtney Lambert Crim, Trinity University

**A23.** *The Interplay between Student and Material Agency in Ecological Investigations*
Michelle Cotterman, Vanderbilt University, michelle.e.cotterman@vanderbilt.edu
Richard Lehrer, Vanderbilt University
Leona Schauble, Vanderbilt University/Peabody College

## Monday, March 26, 2012

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

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

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

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

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

**A31.** *Exploring CoRes as an Effective Framework for Developing PCK with In-service Science Teachers*
Adam Bertram, Monash University, adam.bertram@monash.edu

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

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

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

## Monday, March 26, 2012

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

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

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

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

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

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

**A49.** *Learning about Error with a Virtual Laboratory: Evidence from a Biomedical Engineering Course*
Eva Erdosne Toth, West Virginia University, eva.toth@mail.wvu.edu
Cerasela-Zoica Dinu, West Virginia University, Department of Chemical Engineering

**A51.** *Assessment of Argumentation Skills through Individual Written Instruments and Lab Reports in Introductory Biology*
Melissa Schen, Wright State University, melissa.schen@wright.edu

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

## Monday, March 26, 2012

**A55.** *College Students' Mental Models and Predictions: An Example of Heat Convection*
Guo-Li Chiou, National Chiao Tung University, Taiwan, gc2158@columbia.edu

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

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

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

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

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

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

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

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

## Monday, March 26, 2012

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

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

**A73.** *Subject Matter Equivalencies: Are All Majors Equal?*
Beth W. Kubitskey, Eastern Michigan University, mkubitske1@emich.edu

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

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

**A79.** *Partners in Denial? A Link Found between Ecological Worldview and Attitudes toward Teaching Evolution*
Bryan H. Nichols, University of South Florida, bryanhnichols@gmail.com

**A81.** *Are We Failing to Prepare 21st Century Teachers for Diversity Lost?: Climate's Influence on Evolution*
Norman Thomson, University of Georgia, nthomson@uga.edu
Deborah Tippins, University of Georgia
Rene Bobe, University of Georgia
Anna Scott, Athens Academy Upper School
Leonard Bloch, University of Georgia
Bahadir Namdar, University of Georgia
Sarah Hakala, University of Georgia

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

## Monday, March 26, 2012

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

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

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

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

**A91.** *Unexpected Allies: Advancing Scientific Literacy in an Interdisciplinary Context*
Billy Mcclune, Queen's University Belfast, w.mcclune@qub.ac.uk
Ruth Jarman, Queen's University Belfast

**A93.** *High School Chemistry Teachers' Assessment Literacy*
Shannon M. Burcks, University of Missouri-Columbia, burckssm@missouri.edu
Marcelle A. Siegel, University of Missouri-Columbia
Kemal Izci, University of Missouri Columbia
Stephen B. Witzig, University of Missouri-Columbia
Steven W. Keller, University of Missouri-Columbia

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

## Monday, March 26, 2012

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

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

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

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

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

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

**A105.** *Assessing Interdisciplinary Understanding in Science: The IT3 Framework*
Ji Shen, University of Georgia, jishen@uga.edu
Shannon Sung, University of Georgia
Wendell F. Rogers, Jr., University of Georgia

**A107.** *Developing Computer Model-Based Formative Assessments for High School Chemistry*
Xiufeng Liu, State University of New York At Buffalo (SUNY), xliu5@buffalo.edu
Noemi Waight, University at Buffalo
Roberto Gregorious, Canisius College
Erica L. Smith, University of Buffalo

**A109.** *Leveraging Formative Assessment to Foster Scientific Argumentation among Students in a Middle School Classroom*

Gayle A. Buck, Indiana University Bloomington, gabuck@indiana.edu
Amy Trauth-Nare, Indiana University
Jianlan Wang, Indiana University

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

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

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

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

**A117.** *A "B" Isn't Good Enough: Gendered Expectations for ELL Students' Science Achievement and Participation*
Kathyrn Scantlebury, University of Delaware, kscantle@udel.edu
Beth A. Wassell, Rowan University
Sonya N. Martin, Seoul National University

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

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

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

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

**A125.** *Video Games in Middle School Science: Overcoming Spore's Flaws to Promote Conceptual Understanding*

## Monday, March 26, 2012

Peter G. Schrader, University of Nevada, Las Vegas, pg.schrader@unlv.edu
Hasan Deniz, University of Nevada, Las Vegas
Joshua Keilty, The Alexander Dawson School at Rainbow Mountain

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

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

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

**A133.** *Developing Technological Pedagogical Content Knowledge in an Experiential Environmental Science Course Using Geospatial Technologies*
Rita Hagevik, The University of North Carolina at Pembroke, rita.hagevik@uncp.edu
Patty Stinger-Barnes, The University of Tennessee
Jessica Horton, The University of Tennessee

**Strand 13: History, Philosophy, and Sociology of Science**
***Poster Session A***
3:15pm – 4:15pm, Griffin Exhibit Hall

**A135.** *Science Teachers' Views about Teaching Socioscientific Issues: Understandings, Experiences and Suggestions*
Ahmet Kilinc, ahmet_tr@yahoo.com
Dilber Bahceci
Umit Demiral
Nagihan Tanik
Baris Eroglu
Kasim Yildirim
Ozkan Gorgulu
Ozlem Afacan
Mutlu Pinar Demirci Guler
Arzu Sonmez

## Monday, March 26, 2012

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

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

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

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

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

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

**A147.** *High School Students' Understanding of Global Climate Change*
Natalie N. Torres, California State University, Long Beach, price.torres@gmail.com
James F. Kisiel, California State University, Long Beach

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

**A151.** *Which One Predict University Students' Pro-environmental Behavior More? Nature Relatedness or Environmental Motive Concern?*
Guliz Karaarslan, Agri Ibrahim Cecen University
Birgul Cakir, Agri Ibrahim Cecen University
Elvan Sahin, Middle East Technical University
Hamide Ertepinar, Middle East Technical University
Ozlem Oktay, Middle East Technical University

## Monday, March 26, 2012

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

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

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

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

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

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

**B6.** *Children Learning to Explain Astronomy across Moving Frames of Reference: Kinesthetic and Visualization Strategies*
Julia D. Plummer, Pennsylvania State University, jdp17@psu.edu
Alicia Kocareli, Arcadia University
Cynthia Slagle, Colonial School District

**B8.** *How to Assess Modeling Ability? A Comparison of Different Concept Mapping Practices at Primary School*
Kristina Brandstädter, IPN, Kiel Germany, brandstaedter@ipn.uni-kiel.de
Cornelia Sommer, IPN, Kiel Germany
Ute Harms, IPN, Kiel Germany
Jörg Großschedl, IPN, Kiel Germany

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

**B12.** *Learners' Strategies for Size Estimation*
Cesar Delgado, The University of Texas at Austin, cesar_delgado@austin.utexas.edu

Hye Sun You, The University of Texas at Austin

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

**Strand 2: Science Learning: Contexts, Characteristics and Interactions**
***Poster Session B***
4:15pm – 5:15pm, Griffin Exhibit Hall

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

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

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

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

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

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

**Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies**
***Poster Session B***
4:15pm – 5:15pm, Griffin Exhibit Hall

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

## Monday, March 26, 2012

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

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

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

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

**B36.** *Making Connections: Comparison Tasks and Analogical Mapping as a Scaffold for Argumentation*
Brandon Emig, North Carolina State University, bremig@ncsu.edu
Scott P. McDonald, Pennsylvania State University

**B38.** *Understanding the PCK and Practices of Early Career Science Teachers in Diverse Settings: A Longitudinal Multiple Case Study*
Irasema B. Ortega, University of Alaska-Anchorage, iortega2@uaa.alaska.edu
Julie A. Luft, The University of Georgia

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

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

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

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

**B46.** *Assessing the Impact of a Values Affirmation Task across Biology, Biochemistry, and Physics*
Jennifer L. Momsen, North Dakota State University, Jennifer.Momsen@ndsu.edu

Erika Offerdahl, North Dakota State University
Warren Christensen, North Dakota State University
Shanda Lauer, North Dakota State University
Lisa Montplaisir, North Dakota State University
Mila Kryjevskaia, North Dakota State University

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

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

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

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

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

**Strand 6: Science Learning in Informal Contexts**
***Poster Session B***
4:15pm – 5:15pm, Griffin Exhibit Hall

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

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

Dianne Fraser, Mount Saint Vincent University

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

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

**B66.** *Talking About Science: The Discursive Experiences of Science Center Staff*
Andrea M. Motto, Virginia Tech, ammotto@vt.edu

**Strand 7: Pre-service Science Teacher Education**
***Poster Session B***
4:15pm – 5:15pm, Griffin Exhibit Hall

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

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

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

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

## Monday, March 26, 2012

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

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

**B80.** *Prospective Elementary Teachers' Reflections on Learning-To-Teach Science Experiences*
Lucy Avraamidou, University of Nicosia, avraamidou.l@unic.ac.cy

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

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

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

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

**B88.** *Committed to Teaching: Beliefs of Persisting Beginning Secondary Science Teachers*
Sissy S. Wong, University of Houston, sissywong@uh.edu
Irasema B. Ortega, University of Alaska Ancourage
Jonah B. Firestone, Arizona State University
Krista Adams, University of Nebraska-Lincoln
Julie A. Luft, The University of Georgia

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

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

## Monday, March 26, 2012

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

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

**B96.** *Confronting Myths of the Science Teacher Educator: Becoming a "Facilitator" Instead of "Expert"*
Nicole Beeman-Cadwallader, Indiana University, nbeeman@umail.iu.edu
Gayle A. Buck, Indiana University
Amy Trauth-Nare, Indiana University

**Strand 10: Curriculum, Evaluation, and Assessment**
***Poster Session B***
4:15pm – 5:15pm, Griffin Exhibit Hall

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

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

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

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

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

**B108.** *Development of the Critical Engineering Literacy Test (CELT)*
Senay Purzer, Purdue University, spurzer@purdue.edu

Michael Fosmire, Purdue University
Ruth E.H. Wertz, Purdue University

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

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

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

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

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

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

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

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

## Monday, March 26, 2012

**B124.** *Single-sex Physics Instruction: One Way to Foster Girls' and Boys' Interest?*
Knut Neumann, Leibniz Institute for Science Education (IPN) Kiel, neumann@ipn.uni-kiel.de
Andreas Borowski, University Duisburg-Essen

**Strand 12: Educational Technology**
***Poster Session B***
4:15pm – 5:15pm, Griffin Exhibit Hall

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

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

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

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

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

**Strand 13: History, Philosophy, and Sociology of Science**
***Poster Session B***
4:15pm – 5:15pm, Griffin Exhibit Hall

**B136.** *Investigating Gender Differences regarding Informal Reasoning, Epistemological Beliefs and Metacognition*
Ozgul Yilmaz-Tuzun, Middle East Technical University, ozgul@metu.edu.tr

Nilay Ozturk, Middle East Technical University

**B138.** *How Views of a Nobel Laureate can Influence In-service Teachers' Understanding of Nature of Science?*
Mansoor Niaz, Universidad de Oriente, Venezuela, niazma@gmail.com

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

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

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

**B144.** *Building Bridges between Science Classrooms and Working Landscapes through Collaborative Environmental Education Research*
Heidi Ballard, University of California Davis, hballard@ucdavis.edu
Erin Hardie, University of California, Davis
Mary Kimball, Center for Land-Based Learning

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

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

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

## Monday, March 26, 2012

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

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

## Evening/Social Events

**Membership and Elections Committee Sponsored Session**
***Graduate Student Forum***
The Graduate Student Forum aims to guide and encourage beginning researchers by discussing various problems that may arise, e.g. when completing the dissertation or searching for a position. Attendees of the forum are given the opportunity to question a panel of experienced colleagues on all matters of academic interest.
5:30pm – 7:00pm, Room 101
**Presiders:**
Jomo Mutegi, Indiana University - Purdue University Indianapolis, jmutegi@iupui.edu
Kathryn F. Drago, University of Michigan
Eileen C. Parsons, The University of North Carolina

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

**Graduate Student and Early Career Scholars**
***Informal Social***
7:00pm – 8:00pm, Room Location Undecided

## Tuesday, March 27, 2012

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

## Committee Meetings
## 7:00am – 8:15am

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

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

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

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

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

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

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

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

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

**Program Committee Sponsored Session**
***Virtual Pilot Session***
8:30am – 10:00am, Room 313
**Presiders:**
Sharon Lynch, George Washington University
Anita Welch, North Dakota State University

## Tuesday, March 27, 2012

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

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

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

**Strand 1: Science Learning, Understanding and Conceptual Change**
***Strand Sponsored Session - How Best Can Multiple External Representations be Harnessed for Improving Learning in Biology?***
8:30am – 10:00am, Room 310
**Presider:** David F. Treagust, Curtin University, Australia
**Presenters:**
Chi-Yan Tsui, Curtin University, Australia
Anat Yarden, Weizmann Institute of Science, Israel
Phyllis Griffard, Weill Cornell Medical College in Qatar, Qatar
Kristy L. Halverson, University of Southern Mississippi, USA
Konrad Shoenborn, Linköping University, Sweden
Renee S. Schwartz, Western Michigan University, USA
Siu Ling Wong, University of Hong Kong, Hong Kong
Barbara C. Buckley, WestEd, USA
Kai Niebert, Leibniz University Hannover, Germany

**Strand 2: Science Learning: Contexts, Characteristics and Interactions**
***Related Paper Set - Understanding the Role of Context and Activity in Students' Argumentation Practice***
8:30am – 10:00am, Room 302
**Presider:** Leema Berland, University of Texas, Austin

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

*Learning to Argue and Arguing to Learn: A Longitudinal Study of the Impact of Argument-based Instruction on Undergraduate Chemistry Students' Written Arguments*

## Tuesday, March 27, 2012

Joi P. Walker, Florida State University, walkerj@tcc.fl.edu
Victor D. Sampson, Florida State University

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

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

**Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies**
***Building Scientific Explanations***
8:30am – 10:00am, Room 301
**Presider:** Felicia M. Mensah, Teachers College, Columbia University

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

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

*Supporting Fourth Graders' Ability to Interpret Graphs through Real-time Graphing Technology: An Exploratory Study*
Mehmet F. Dulger, UNLV, dulgerm@unlv.nevada.edu
Hasan Deniz, UNLV

*Exploring Scientific Explanations: Promoting Students' Sense-making in Elementary Classrooms*
Mandy Biggers, University of Iowa, mandy-biggers@uiowa.edu
Laura Zangori, University of Iowa
Cory T. Forbes, University of Iowa

**Strand 5: College Science Teaching and Learning (Grades 13-20)**
***Enhancing Scientific Literacy***
8:30am – 10:00am, Room 304
**Presider:** Eva Erdosne Toth, West Virginia University

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

Amira Allouche, Technion, Israel Institute of Technology

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

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

*Rhetorical Moves as a Basis for Teaching Undergraduate Life Science Students to read Primary Literature*
Miriam A. Ossevoort, University of Groningen, The Netherlands, m.a.ossevoort@rug.nl
Edwin B. Van Lacum, University of Groningen, The Netherlands
Martin J. Goedhart, University of Groningen, The Netherlands

**Strand 6: Science Learning in Informal Contexts**
***Developing Interests and Identities towards Science Outside of School***
8:30am – 10:00am, Room 305
**Presider:** Kathleen A. Fadigan, Pennsylvania State University

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

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

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

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

## Tuesday, March 27, 2012

**Strand 7: Pre-service Science Teacher Education**
***Symposium - A Retrospective and Prospective View of Two Studies on Science Teacher Education From 1993-2011: SALISH and IMPPACT***
8:30am – 10:00am, Room 306
**Discussant:**
Robert E. Yager, University of Iowa
**Presenters:**
Patricia Simmons, North Carolina State University, patricia_simmons@ncsu.edu
John Tillotson, Syracuse University
Monica Young, Syracuse University
Deborah Barry, Syracuse University
Lauren Jetty, Syracuse University
Glenn Dolphin, Syracuse University

**Strand 7: Pre-service Science Teacher Education**
***Topic Specific Content Knowledge and Laboratory Experiences***
8:30am – 10:00am, Room 309
**Presider:** Marissa S. Rollnick, Wits University

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

*Development of Pre-service Science Teachers' Metacognition in an Inquiry Based Laboratory Course*
Birgul Cakir, Agri Ibrahim Cecen University, birgulmetu@gmail.com
Hamide Ertepinar, Middle East Technical University
Ozgul Yilmaz-Tuzun, Middle East Technical University

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

**Strand 8: In-service Science Teacher Education**
***Various Representations of Science in the Classroom***
8:30am – 10:00am, Room 105
**Presder:** Wayne Breslyn, University of Maryland

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

## Tuesday, March 27, 2012

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

*Beginning Secondary Science Teachers and Their Use of Technology in the Classroom During Their First Two Years*
EunJin Bang, Iowa State University, ejbang@iastate.edu
Julie A. Luft, The University of Georgia

*Empowering Teachers through a Professional Learning Program that Focussed on a Representation Intensive Pedagogical Approach*
Gail D. Chittleborough, Deakin University, gail.chittleborough@deakin.edu.au
Peter Hubber, Deakin University

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

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

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

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

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

## Tuesday, March 27, 2012

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

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

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

*In Search of Instructional Sensitivity: The Measurement Problem in Large Scale Studies of Professional Development Programs*
Christopher Wilson, BSCS, cwilson@bscs.org
Kathleen J. Roth, BSCS
Joseph A. Taylor, BSCS
Nancy Landes, BSCS
Molly Stuhlsatz, BSCS

*An Analysis of Science Concept Inventories and Diagnostic Tests: Commonalities and Differences*
Dane L. Schaffer, University of Missouri, dlszh3@mail.missouri.edu

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

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

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

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

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

## Tuesday, March 27, 2012

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

*Enhancing Engineering Education through Hands-On Models and Computer-Based Simulations*
Amy R. Pallant, The Concord Consortium, apallant@concord.org
Rachel E. Kay, The Concord Consortium
Charles Xie, The Concord Consortium

*A Study on Enhancing the Thought Experiment in Modeling-based Science Teaching to Improve the Learning Effect*
Jen-Chin Lin,jclin@nknucc.nknu.edu.tw

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

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

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

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

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

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

## Tuesday, March 27, 2012

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

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

**Strand 14: Environmental Education**
***Strand Sponsored Session - Science Education and Climate Change: Policy in K-12 Education in Diverse Global Contexts***
8:30am – 10:00am, Room 303
**Presider:** Sarah J. Carrier,
**Presenters:**
Jennifer D. Adams, Brooklyn College-CUNY, jdadams215@gmail.com
Charles W. Anderson, Michigan State University
J. Randy McGinnis, University of Maryland
Andrew W. Shouse, University of Washington

**Strand 15: Policy**
***Globalization of Science Reforms***
8:30am – 10:00am, Room 104
**Presider:** Gavin W. Fulmer, National Science Foundation

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

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

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

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

## Tuesday, March 27, 2012

### Break
### 10:00am – 10:30am, Foyer – White River Ballroom

**P2. Plenary Session #2**
***Student Diversity and Science Education Research in a Global Context: Research Agenda and the Role of NARST***
10:30am – 12:00pm, White River Ballroom A – E
**Presider:** Sharon Lynch, George Washington University
**Keynote Presenter:** Lee-Salwen Okhee, New York University

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

### Concurrent Session #8
### 2:15pm – 3:45pm

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

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

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

## Tuesday, March 27, 2012

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

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

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

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

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

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

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

*Development and Validation of an Instrument to Assess Precollege Arabic Speaking Students' Attitudes toward Science*
Ryan Summers, University of Illinois at Urbana-Champaign, summers4@illinois.edu
Fouad Abd-El-Khalick, University of Illinois at Urbana-Champaign
Ziad Said, College of the North Atlantic
Heather Freissen, College of the North Atlantic
Michael Culbertson, University of Illinois at Urbana-Champaign

## Tuesday, March 27, 2012

**Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies**
***Elementary Science Teacher Education***
2:15pm – 3:45pm, Room 301
**Presider:** Carolyn S. Wallace, Indiana State University

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

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

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

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

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

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

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

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

## Tuesday, March 27, 2012

Ruth A. Anderson, FACET Innovations, LLC

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

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

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

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

*The Impact of a Summer Research Program on Rising College Freshmens' Integration Into a Science Community of Practice*
Grant E. Gardner, East Carolina University, gardnerg@ecu.edu
Jennifer H. Forrester, The University of Wyoming
Penny Shumaker Jeffrey, North Carolina State University

**Strand 5: College Science Teaching and Learning (Grades 13-20)**
***Symposium - Undergraduate Science Assessment: Current Innovations and Future Obstacles and Opportunities***
2:15pm – 3:45pm, Room 309
**Presider:** Marcelle A. Siegel, University Of Missouri-Columbia
**Presenters:**
Janet Coffey, Gordon & Betty Moore Foundation University of Maryland, College Park
Sandra K. Enger, The University of Alabama in Huntsville
Ellen Osmundson, CRESST, The University of California-Los Angeles
Sarah B. Woodruff, Ohio's Evaluation and Assessment Center for Mathematics and Science Education
Jerome M. Shaw, University of California - Santa Cruz
Dennis W. Sunal, The University of Alabama
Robert E. Yager, The University of Iowa
Marcelle A. Siegel, University Of Missouri-Columbia

## Tuesday, March 27, 2012

Jennifer Clasegens, Northern Arizona University
Michelle Sinapuelas, University of California-Berkley

**Strand 6: Science Learning in Informal Contexts**
***Families Encouraging Science Learning and Participation***
2:15pm – 3:45pm, Room 305
**Presider:** Janell Nicole Catlin, Teachers College, Columbia University

*An Exploratory Study of Parent Involvement by Take-Home Science Activities in Taiwan*
Yi-Ting Cheng, Nation Chenghua University of Education, tonia0213@yahoo.com.tw
Huey-Por Chang, National Changhua University of Education

*Family Meaning-Making and Identity Negotiation at Telescope Observing Events*
Matthew Wenger, University of Arizona, Tucson, mwenger@email.arizona.edu

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

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

**Strand 7: Pre-service Science Teacher Education**
***Pre-service Teacher Beliefs and Efficacy***
2:15pm – 3:45pm, Room 306
**Presider:** Sherry S. Herron, University of Southern Mississippi

*An Exploration of the Relationship between Preservice Teachers' Teacher Efficacy Beliefs and Constructivist-based Teaching Practice*
Tugba Temiz, Yuzuncu Yil University, tugbaaauygun@yahoo.com
Mustafa S. Topcu, Mugla University

*Impact of a Content Area Practicum Experience on Pre-Service Science Teacher Content and Pedagogical Efficacy*
Timothy A. Goodale, College of Coastal Georgia, tgoodale@ccga.edu

*Understanding Preservice Teacher Belief Systems with the Use of a Complex Systems Model*
Brian S. Fortney, The University of Texas at Austin, bfortney@austin.utexas.edu

## Tuesday, March 27, 2012

**Strand 8: In-service Science Teacher Education**
***Mentoring and the Induction Years***
2:15pm – 3:45pm, Room 105
**Presider:** Martina Nieswandt, University of Massachusetts, Amherst

*Qualitative Indicators of Successful Induction: Case Studies of Four Beginning Secondary Science Teachers' Meaning Making and Identities-in-Practice*
Angela W. Webb, Louisiana State University, awwebb@lsu.edu

*Mentoring Science and Mathematics Teachers Using the Plus/Delta: Assessing an Induction Experience*
Sheryl L. Mcglamery, University of Nebraska at Omaha, smcglamery@unomaha.edu
Saundra L. Shillingstad, University of Nebraska at Omaha

*Teacher-to-Teacher Mentoring: A Model for Meaningful Professional Development that Facilitates Teacher Change*
Jason Petula, Penn State Harrisburg, jason.petula@psu.edu

*Beginning Secondary Science Teachers' Beliefs, Practices, and Experiences: A Five-Year Mixed Methods Study*
Julie A. Luft, The University of Georgia, jaluft@uga.edu
Jonah B. Firestone, Arizona State University
Charles B. Weeks, Arizona State University
Sissy S. Wong, University of Houston
Krista Adams, University of Nebraska
Irasema B. Ortega, University of Alaska

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

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

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

## Tuesday, March 27, 2012

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

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

**Strand 10: Curriculum, Evaluation, and Assessment**
***Assessment Development and Application in Undergraduate Sciences***
2:15pm – 3:45pm, Room 308
**Presider:** Mandy L. Kirchgessner, Temple University

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

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

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

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

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

*Islam and Evolutionary Science: Secondary Students' Conceptions of Evolution from Five Countries*
Anila Asghar, McGill University, anila.asghar@mcgill.ca

Joshua Rosenau, National Center for Science Education
Jason R. Wiles, Syracuse University
Saouma B. Boujaoude, American University of Beirut
Minoo Derayeh, York University
Quinn O., McGill University
Brian Alters, Chapman University

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

*How Universal is Students' Interest in Biology? Correlation between Interest in Biology, Gender, Culture and Religion*
Ayelet Baram-Tsabari, Technion - Israel Institute of Technology, ayelet@technion.ac.il
Galit Hagay, Technion - Israel Institute of Technology
Jaume Ametller, University of Leeds
Gultekin Cakmakci, Hacettepe University
Betina Lopes, University of Aveiro
Aurora Moreira, University of Aveiro
Helena Pedrosa-de-Jesus, University of Aveiro

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

**Strand 12: Educational Technology**
***Evaluation and Instrumentation of Technological Endeavors***
2:15pm – 3:45pm, Room 101
**Presider:** Noemi Waight, University at Buffalo

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

*Development of a Short Form Measure of Science and Technology Self-Efficacy using Rasch Analysis*
Richard L. Lamb, George Mason University, lambrl9137@gmail.com
David B. Vallett, George Mason University
Leonard A. Annetta, George Mason University
Rebecca Cheng, George Mason University

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

## Tuesday, March 27, 2012

**Strand 13: History, Philosophy, and Sociology of Science**
***Elementary Teachers' View of NOS***
2:15pm – 3:45pm, Room 102
**Presider:** Selina Bartels, Illinois Institute of Technology

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

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

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

*Exploring Elementary Science Methods Course Contexts for Improving Nature of Science Conceptions and Understandings of NOS Teaching Strategies*
Valarie L. Akerson, Indiana University, vakerson@indiana.edu
Ingrid S. Weiland, University of Louisville
Kader Bilican, METU
Khemawaddee Pongsanon, Indiana University
Meredith A. Park Rogers, Indiana University

**Strand 14: Environmental Education**
***Fostering Decision Making to Promote Sustainable Environmental Attitudes and Behaviours***
2:15pm – 3:45pm, Room 103
**Presider:** Maurice DiGiuseppe, University of Ontario Institute of Technology

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

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

## Tuesday, March 27, 2012

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

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

**Strand 15: Policy**
***Symposium - Developing Resources that Connect Learning Progression Research to Science Standards***
2:15pm – 3:45pm, Room 104
**Presider:** Aaron D. Rogat, Teachers College, Columbia University
**Discussant:** Amelia Wenk Gotwals, Michigan State University
**Presenters:**
Joseph S. Krajcik, University of Michigan
Marianne Wiser, Clark University
Jennifer Hicks, Indiana Department of Education
Stephen Pruitt, Achieve

## Concurrent Session #9
## 4:00pm – 5:30pm

**Strands 1 and 2 Joint Sponsored Administrative Session**
***Symposium – Connecting Research and Practice of Science Education: A Symposium in Honor of Phil Scott***
4:00pm – 5:30pm, Room 313
**Presiders:**
Jan H. Van Driel, janvandriel@aol.com
Xiufeng Liu, State University of New York at Buffalo
J. Randy McGinnis, University of Maryland
**Presenters:**
Eduardo F. Mortimer, Universidade Federal de Minas Gerais, Brazil
Asma Almahrouqi, University of Leeds
Edenia Ribeiro do Amaral, Universidade Federal Rural de Pernanbuco
Jouni Viiri, University of Finland
Carl Angell, University of Oslo, Norway
Jonathan Emberton, Teacher of Physics in the North of England
Jim Ryder, University of Leeds, UK

## Tuesday, March 27, 2012

**Strand 1: Science Learning, Understanding and Conceptual Change**
***Learning Using Mental and Conceptual Models***
4:00pm – 5:30pm, Room 310
**Presider:** Saouma B. Boujaoude, American University of Beirut

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

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

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

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

**Strand 2: Science Learning: Contexts, Characteristics and Interactions**
***School Contexts***
4:00pm – 5:30pm, Room 302
**Presider:** Martina Nieswandt, University of Massachusetts, Amherst

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

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

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

## Tuesday, March 27, 2012

Jenny D. Ingber, Bank Street College of Education

*Effects of Class Size and School Location on Students' Perception of Learning Environment in Turkey*
Muhammet Mustafa Alpaslan, Texas A&M University, alpaslan27@tamu.edu
Nevzat Yigit, Karadeniz Technical University
Yasin Cinemre, Karadeniz Technical University, Trabzon, Turkey
Bilal Balcin, Karadeniz Technical University, Trabzon, Turkey

**Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies**
***Teacher Knowledge***
4:00pm – 5:30pm, Room 301
**Presider:** Therese B. Shanahan, University of California - Irvine

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

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

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

**Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies**
***Symposium - Learning from Children: A Conversation about Science Education in the Early Years***
4:00pm – 5:30pm, Room 303
**Discussant:** Cynthia C. Deaton, Clemson University
**Presenters:**
Cassie Quigley, Clemson University, cassieq@clemson.edu
Christina Siry, University of Luxembourg
Deborah C. Smith, Penn State University
Bhaskar Upadhyay, University of Minnesota
Maria Varelas, University of Illinois at Chicago
Lynne Pieper, University of Illinois at Chicago
Amy Arsenault, University of Illinois at Chicago

## Tuesday, March 27, 2012

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

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

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

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

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

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

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

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

## Tuesday, March 27, 2012

Christopher J. Harris, SRI International

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

*The Impacts of Informal Science on Girls' Interest, Engagement, and Participation in Science Communities, Hobbies and Careers*
Lynn D. Dierking, Oregon State University, dierkinl@science.oregonstate.edu
Dale McCreedy, Franklin Institute Science Museum
Jessica Luke, Institute for Learning Innovation

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

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

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

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

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

## Tuesday, March 27, 2012

**Strand 7: Pre-service Science Teacher Education**
***Addressing Culture/High Need Classrooms in Teacher Preparation***
4:00pm – 5:30pm, Room 309
**Presider:** Gale A. Seiler, McGill University

*Investigation of Pre-service Science Teachers' Informal Reasoning, Epistemological Beliefs, and Metacognitive Awareness Regarding Socioscientific Issues*
Nilay Ozturk, Middle East Technical University, onilay@metu.edu.tr
Ozgul Yilmaz-Tuzun, Middle East Technical University

*Pre-Service Science Teacher Understandings about the Role of Culture in the Classroom*
Stephen Krajeski, Penn State University, sek194@psu.edu

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

*Preparing Teachers for Teaching in High-need Schools: A Comparison of Two Science Education Programs*
Kevin Goff, College of William & Mary, kdgoff@email.wm.edu
Juanita Jo Matkins, College of William & Mary
Jacqueline Theresa Mcdonnough, Virginia Commonwealth University

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

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

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

*The Use of Blogging as a Tool to Support Teachers' Identity Development as Leaders*
Deborah L. Hanuscin, University of Missouri, hanuscind@missouri.edu
Ya-Wen Cheng, University of Missouri

## Tuesday, March 27, 2012

Carina M. Rebello, University of Missouri
Somnath Sinha, University of Missouri
Nilay Muslu, University of Missouri, Columbia

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

**Strand 8: In-service Science Teacher Education**
***Teachers Learning Content, Inquiry, and Universal Design***
4:00pm – 5:30pm, Room 106
**Presider:** Irene U. Osisioma, California State University, Dominguez Hills

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

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

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

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

## Tuesday, March 27, 2012

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

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

*Instructional and School Factors and their Influence on Science Competencies*
Nai-en Tang, University of Missouri-Columbia, naientang@gmail.com
Chia-Lin Tsai, University of Missouri-Columbia
Lloyd H. Barrow, University Of Missouri

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

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

**Strand 11: Cultural, Social, and Gender Issues**
***Exploring Elementary Science Education and Parent Participation for STEM Pipeline***
4:00pm – 5:30pm, Room 107
**Presider:** Felicia M. Mensah, Teachers College, Columbia University

*Effective Urban Elementary Teachers of Inquiry Science: Beliefs, Knowledge, and Resources Shaping Teacher Planning*
Elaine M. Silva Mangiante, University of Rhode Island, emangiante@cox.net

*Exceptional Practices and Unconventional Norms: Parents' Initiatives for assisting their Children's STEM Learning*
Rashmi Kumar, University of Pennsylvania, rashmikupenn@gmail.com

*Geeks or Freaks? How Primary School Children View Science-keen Peers*
Jennifer DeWitt, King's College London, jennifer.dewitt@kcl.ac.uk

## Tuesday, March 27, 2012

Louise Archer, King's College London
Jonathan F. Osborne, Stanford University

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

**Strand 12: Educational Technology**
***Symposium - Digital Resources to Support Science Instruction: Research, Development and Practice***
4:00pm – 5:30pm, Room 101
**Presider:** Alice Anderson, Education Development Center, Inc.
**Discussant:** Eric N. Wiebe, North Carolina State University
**Presenters:**
Lauren Goldenberg, Education Development Center, Inc.
Catherine E. Milne, New York University
Ruth Schwartz, New York University
Mimi Recker, Utah State University
Al Byers, National Science Teachers Association
Chad Dorsey, The Concord Consortium
Marian Pasquale, Education Development Center, Inc.
Ted Sicker, WGBH Teachers' Domain

**Strand 13: History, Philosophy, and Sociology of Science**
***Assessing NOS***
4:00pm – 5:30pm, Room 102
**Presider:** Jonah B. Firestone, Arizona State University

*Pathways of a Humanistic Approach to Science Education: A Review of the Literature*
Jeremy Price, Boston College, jeremy.price@bc.edu

*Turkish Preservice Teachers' Epistemological beliefs in Physics, Chemistry, and Biology: A Mixed Study*
Mustafa S. Topcu, Mugla University, msamitopcu@gmail.com

*Development and Validation of a Rubric to Score the Views of Nature of Science (VNOS) Questionnaire*
Fouad Abd-El-Khalick, University of Illinois at Urbana-Champaign, fouad@illinois.edu
Jeremy Belarmino, University of Illinois at Urbana-Champaign
Ryan Summers, University of Illinois at Urbana-Champaign

*Using Text Mining Technique to Categorize Science Writings According to Their Inclusion of Nature of Science: Implications for Practice and Research*
Feng Jiang, University of Arkansas, fjiang@uark.edu
William F. Mccomas, University of Arkansas

## Tuesday, March 27, 2012

**Strand 14: Environmental Education**
***Using Placed-based Frameworks to Engage Learners in Environmental Education***
4:00pm – 5:30pm, Room 103
**Presider:** Rita Hagevik, The University of North Carolina at Pembroke

*Merging Place-based Environmental Science and Traditional Ecological Knowledge in Secondary and Postsecondary Educational Settings*
Daniel R. Zalles, SRI International, daniel.zalles@sri.com
Brian D. Collins, University of Washington
Cynthia Updegrave, University of Washington
David R. Montgomery, University of Washington
Thomas G. Colonese, University of Washington
Amir J. Sheikh, University of Washington, Seattle

*Engaging Underrepresented Youth through the Enactment of an Urban Environmental and Geoscience Place-based Curriculum*
Amy DeFelice, CUNY, amyferguson3@hotmail.com
Jennifer D. Adams, Brooklyn College- CUNY
Pieranna Pieroni, Brooklyn College- CUNY
Brett Branco, Brooklyn College- CUNY

*Teaching Earth Smarts: A Pragmatic, Nonpartisan Educational Construct for Socioecological Literacy*
Bryan H. Nichols, University of South Florida, bryanhnichols@gmail.com
Dana L. Zeidler, University of South Florida

*This is More Like Home: Enriching Students' Thou Relationship with Nature through Community Mapping*
Susan Jagger, OISE/University of Toronto, s.jagger@utoronto.ca

## Tuesday, March 27, 2012

## Evening/Social Events

**Membership and Elections Committee Sponsored Session**
***Early Career and Junior Faculty Early Career Discussion***
This session is particularly designed for the early career, junior faculty who need support during the first years of their academic career. The focus will be a panel discussion with experienced faculty who can guide junior faculty through important issues that pertain to the tenure process and other issues. Discussion topics include, but are not limited to: publications, research in the new position, collaboration with different colleges within the university setting, teaching loads, the tenure and promotion process, etc. We invite all junior faculty interested in this topic to join us.
5:45pm – 6:45pm, Room 101
**Presiders:**
Reizelie Barreto-Espino, Towson University

**Publisher Reception—TBD**
***By Invitation***
6:00pm – 8:30pm, White River Ballroom A

**Publisher Reception—TBD**
***By Invitation***
7:00pm – 9:00pm, White River Ballroom B

**Equity and Ethics Committee Sponsored Dinner**
7:00pm – 9:00pm, Off-site – Buca di Beppo Italian Resturant
Dinner, including tax and graduity, is $35.
NOTE: You must register for this event with your Advance Conference Registration (90 participants max).

**Social**
More info to add here?
8:00pm – 10:30pm, White River Ballroom G – J

## Wednesday, March 28, 2012

**Conference Registration**
7:00am – 12:00pm, White River Registration

## Strand Meetings
## 7:00am – 8:15am

**Strand 1: Science Learning, Understanding and Conceptual Change**
Meeting—7:00am – 8:15am, Room 301

**Strand 2: Science Learning: Contexts, Characteristics and Interactions**
Meeting—7:00am – 8:15am, Room 302

**Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies**
Meeting—7:00am – 8:15am, Room 303

**Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies**
Meeting—7:00am – 8:15am, Room 304

**Strand 5: College Science Teaching and Learning (Grades 13-20)**
Meeting—7:00am – 8:15am, Room 305

**Strand 6: Science Learning in Informal Contexts**
Meeting—7:00am – 8:15am, Room 306

**Strand 7: Pre-service Science Teacher Education**
Meeting—7:00am – 8:15am, Room 308

**Strand 8: In-service Science Teacher Education**
Meeting—7:00am – 8:15am, Room 313

**Strand 9: Reflective Practice**
Meeting—7:00am – 8:15am, Room 206

**Strand 10: Curriculum, Evaluation, and Assessment**
Meeting—7:00am – 8:15am, Room 311

**Strand 11: Cultural, Social, and Gender Issues**
Meeting—7:00am – 8:15am, Room 312

**Strand 12: Educational Technology**
Meeting—7:00am – 8:15am, Room 314

## Wednesday, March 28, 2012

**Strand 13: History, Philosophy, and Sociology of Science**
Meeting—7:00am – 8:15am, Grand Ballroom V-A

**Strand 14: Environmental Education**
Meeting—7:00am – 8:15am, Grand Ballroom V-B

**Strand 15: Policy**
Meeting—7:00am – 8:15am, Grand Ballroom VI-A

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

**Equity and Ethics Committee Sponsored Session**
***New Scholars Symposium Sponsored by the Equity and Ethics Committee: Teaching and Learning Science in Diverse Contexts -- Local and Global Perspectives***
8:30am – 10:00am, Room 313
**Presider:** Bhaskar Upadhyay, University of Minnesota
**Discussant:** Valarie L. Akerson, University of Indiana-Bloomington
**Presenters:**
Femi Otulaja, University of Witwatersrand-Johannesburg, South Africa
Vanashri Nargund-Joshi, Indiana University-Bloomington
Minjung Ryu, University of Maryland-College Park
Nai-en Tang, University of Missouri-Columbia
Idaykis Rodriguez, Florida International University-Miami
Renee Michelle Goertzen, Florida International University-Miami
Eric Brewe, Florida International University-Miami
Laird H. Kramer, Florida International University-Miami
Ingrid M. Sanchez Tapia, University of Michigan
Consuelo J. Morales, University of Michigan
Teresa Satterfield, University of Michigan
Jean Rockford Aguilar-Valdez, University of North Carolina at Greensboro
Nievita Bueno Watts, Purdue University

**Strand 2: Science Learning: Contexts, Characteristics and Interactions**
***Science Inquiry***
8:30am – 10:00am, Room 302
**Presider:** Jonathan F. Osborne, Stanford University

*Inquiry and Elementary Science Learning: Evidence from a Randomized Trial of the Science Writing Heuristic*
Mack Shelley, Iowa State University, mshelley@iastate.edu
Christopher Gonwa-Reeves, Iowa State University
Joan Baenziger, Iowa State University

Ashley Seefeld, Iowa State University
Brian M. Hand, University of Iowa
William Therrien, University of Iowa

*Integrating the Outdoor Learning Environment into Formal Science: Testing the Model across Culture and Age*
Molly L. Yunker, Weizmann Institute of Science, molly.yunker@weizmann.ac.il
Nir Orion, Weizmann Institute of Science

*Assessment of Group Learning in Interdisciplinary Environments*
Bijaya Aryal, University of Minnesota-Rochester, baryal@umn.edu
Robert L. Dunbar, University of Minnesota-Rochester
Rajeev S. Muthyala, University of Minnesota-Rochester

*Studying the Process of Decision-making in an Inquiry-based Module*
Eduardo F. Mortimer, Universidade Federal de Minas Gerais Brazil, mortimer@ufmg.br
Fábio Augusto R. Silva, Universidade Federal de Ouro Preto Brazil

**Strand 2: Science Learning: Contexts, Characteristics and Interactions**
***Secondary Science***
8:30am – 10:00am, Room 311
**Presider:** Phyllis Katz, University of Maryland

*Hearing the Meanings Expressed by High School Students of Science: A Qualitative Study*
Jeremy Price, Boston College, jeremy.price@bc.edu

*The Influence of Lab Activities, Teacher Certification and Subject on Students' Engagement, Motivation and Learning*
Diana J. Zaleski, Northern Illinois University, DZaleski07@gmail.com
Lee Shumow, Northern Illinois University
Jennifer A. Schmidt, Northern Illinois University

*Positionality in the Physics Classroom: Implications for Student Engagement*
Zahra Hazari, Clemson University, zahra@clemson.edu
Cheryl A.P. Cass, North Carolina State University
Carrie E. Beattie, Clemson University
Robynne M. Lock, Clemson University

*Comparative Study of the Learning Environments of Secondary Science Classrooms in Government and Private Schools*
Adit Gupta, Model Institute of Education and Research, Jammu, India, aditgupta@yahoo.com

## Wednesday, March 28, 2012

**Strand 3: Science Teaching--Primary School (Grades preK-6): Characteristics and Strategies**
***Related Paper Set - Beyond Student Test Scores: A More Comprehensive Look at Quality of Teaching***
8:30am – 10:00am, Room 301
**Discussant:** Kathleen J. Roth, BSCS

*Examining Quality of Teaching from Different Perspectives*
Maria Araceli Ruiz-Primo, University of Colorado Denver, maria.ruiz-primo@ucdenver.edu
Min Li, University of Washington

*Knowledge of Learning Goals as a Navigation Tool in Curriculum Implementation*
Ming-Chih Lan, University of Washington, mclan@uw.edu
Michael Giamellaro, University of Colorado Denver
Min Li, University of Washington
Maria Araceli Ruiz-Primo, University of Colorado Denver

*Supporting Students to Make Conceptual Connections*
Min Li, University of Washington, minli@u.washington.edu
Ming-Chih Lan, University of Washington
Maria Araceli Ruiz-Primo, University of Colorado Denver
*Michael Giamellaro, University of Colorado Denver*
Ting Wang, University of Washington
Jennifer Feehan, University of Colorado Denver
Mchale Aaron Orgeron, University of Colorado Denver

*Quality Teaching as Reflected in Productive Failure*
Michael Giamellaro, University Of Colorado Denver, michael.giamellaro@ucdenver.edu
Maria Araceli Ruiz-Primo, University of Colorado Denver
Min Li, University of Washington
Kellie Wills, University of Washington
Ming-Chih Lan, University of Washington

*Knowing where Students are: Finding out What Students Know and Moving their Learning Forward*
Hillary Mason,Hillary.Mason@ucdenver.edu
Maria Araceli Ruiz-Primo, University of Colorado Denver
Min Li, University of Washington
Michael Giamellaro, University of Colorado Denver

**Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies**
***Inquiry Based Teaching and Learning***
8:30am – 10:00am, Room 303
**Presider:** Jodie Galosy, Knowles Science Teaching Foundation

*Influences on Teachers' Capacities to use Educative Curriculum Materials as Intended*
Sihan Xiao, University of California, Los Angeles, shxiao@ucla.edu

William A. Sandoval, University of California, Los Angeles

*Cooperative Learning and Intergroup Competition in Biology Education*
Sarah Sennebogen, University of Munich (LMU), Sarah.Sennebogen@lrz.uni-muenchen.de
Birgit Jana Neuhaus, University of Munich (LMU)

*Project-Based Teaching: Supporting Students in Making Connections*
Heather J. Johnson, Vanderbilt University, heather.j.johnson@vanderbilt.edu

*iCoach-Teacher Teams Professional Development: The Influence of Coach led Reflection, Practice Teaching, and Content Instruction on Middle School Teachers' Use of Inquiry Practices*
Christine R. Lotter, University of South Carolina, lotter@mailbox.sc.edu
Jan Yow, University of South Carolina

**Strand 5: College Science Teaching and Learning (Grades 13-20)**
***Developing Conceptual Understanding in Science***
8:30am – 10:00am, Room 304
**Presider:** Leigh S. Arino De La Rubia, Tennessee State University

*Tracking College Students' Growth in Understanding of the Particulate Nature of Matter*
James M. Nyachwaya, University of Minnesota, nyach002@umn.edu
Jamie L. Schneider, University of Wisconsin, River Falls
Nathan B. Wood, North Dakota State University
Abdirizak W. Mohammed, University of Minnesota
Anne L. Kern, University of Idaho
Gillian Roehrig, University of Minnesota

*Improving College Students' Interdisciplinary Science Understanding*
Shannon Sung, The University of Georgia, shasung@uga.edu
Ji Shen, The University of Georgia
Kathrin Stanger-Hall, The University of Georgia

*University Students' Informal Reasoning Progression on NDM-1 Socio-scientific Issue: A Preliminary Study*
Tzu-Chun Huang, National Taichung University, smy@mail.ntcu.edu.tw
Shu-Mey Yu, National Taichung University
Yu-Hsiang Su, National Taichung University

*Progress Made in the Development of a Conceptual Roadmap for Chemistry and Nanoscience Education*
Alan K. Szeto, Purdue University Calumet, alan.szeto@purduecal.edu

## Wednesday, March 28, 2012

**Strand 6: Science Learning in Informal Contexts**
***Fostering Complex Learning in Museums***
8:30am – 10:00am, Room 305
**Presider:** Jennifer DeWitt, King's College London

*Re-Imagining Science Museums: Communities of Environmental Lifelong Learners*
Kathleen A. Fadigan, Pennsylvania State University, kxf24@psu.edu

*Guiding Play with Technology to Improve Science Affect and Learning*
David E. Kanter, New York Hall of Science, dkanter@nysci.org
Sameer Honwad, New York Hall of Science
Cheryl Kwinn, Tufts University
Adiel Fernandez, New York Hall of Science

*Learning at the Museum: Sspects of Learning in German Natural History Museums from the Museum Educator's Point of View*
Jennifer H. Härting, Jennifer.Haerting@uni-vechta.de

*Using Educational Research in the Development of Science Exhibitions*
Antti Laherto, University of Helsinki, Finland, antti.laherto@helsinki.fi

**Strand 7: Pre-service Science Teacher Education**
***Technology in Pre-Service Teacher Education***
8:30am – 10:00am, Room 306
**Presider:** Kristin L. Cook, Indiana University

*Investigating Pre-service Science Teachers' Content Knowledge And Perceived TPACK Regarding Genetics*
Meltem Savas, Middle East Technical University, msavas@metu.edu.tr
Ozgul Yilmaz-Tuzun, Middle East Technical University

*Preservice Teachers as eMentors: Using Web 2.0 Learning Tools To Foster Student Inquiry*
Gabriela Jonas-Ahrend, University of Dortmund, gabriela.jonas-ahrend@uni-dortmund.de
M. Randall Spaid, Macon State College
Stuart Fleischer, The American International School in Israel

*Using Blogging as a Disruptive Design for Learning in Pre-Service Teacher Education Courses*
Janice L. Anderson, University of North Carolina at Chapel Hill, anderjl@email.unc.edu
Julie E. Justice, University of North Carolina at Chapel Hill
Steven D. Wall, University of North Carolina at Chapel Hill

*Using PhotoVoice to Empower Pre-service Teachers to Connect Science to Their Daily Lives*
Kristin L. Cook, Indiana University, kshockey@indiana.edu
Cassie Quigley, Clemson University

## Wednesday, March 28, 2012

**Strand 7: Pre-service Science Teacher Education**
***Field Experiences as a Factor in Pre-service Teacher Development II***
8:30am – 10:00am, Room 312
**Presider:** Vanessa Kind, Durham University

*Curriculum Materials Analysis as a Boundary Spanning Task: Bridging Science Methods and Field Placement Discourses*
Kristin L. Gunckel, University of Arizona, kgunckel@email.arizona.edu

*Examining the Role of School-Based Experiences in Preparing Pre-Service Teachers for Science Teaching*
Angela Fitzgerald, Monash University, Melbourne, Australia, angela.fitzgerald@monash.edu
Katrin Schneider, Monash University, Melbourne, Australia

*Science Educator Identity Formation: The Impact of Place-Based Teaching Opportunities*
Jennifer H. Forrester, The University of Wyoming, jforres5@uwyo.edu
Jason M. Katzmann, The University of Wyoming

**Strand 8: In-service Science Teacher Education**
***Symposium - Different Ways to Investigate Teachers' Pedagogical Content Knowledge***
8:30am – 10:00am, Room 206
**Presider:** Andreas Borowski, RWTH Aachen University
**Presenters:**
Sophie Kirschner, University Duisburg-Essen
Janet Carlson, BSCS
Ineke Henze, Radboud University, Nymegen
Julie Gess-Newsome, Willamette University
Hans E. Fischer, University Duisburg-Essen
Jan H. Van Driel, Leiden University

**Strand 10: Curriculum, Evaluation, and Assessment**
***Middle School Curriculum and Evaluation***
8:30am – 10:00am, Room 308
**Presider:** Gayle A. Buck, Indiana University

*Assessing NOS Knowledge using Network Analysis: An Examination of Students' Growth in a Contextualized Environment*
Erin E. Peters-Burton, George Mason University, epeters1@gmu.edu

*The Effects of Coherent Curriculum on Middle School Students' Understanding of Key Chemistry Ideas*
Joseph S. Krajcik, University of Michigan, krajcik@umich.edu
LeeAnn M. Sutherland, University of Michigan
Sung-Youn Choi, University of Michigan
Joi Merritt, Michigan State University

Kathryn F. Drago, University of Michigan

*Students' Errors Using Geographically Variable Data to Support Scientific Predictions*
Sarah J. Fick, University of Michigan, sfick@umich.edu

*Results from a Pilot Study of a Curriculum Unit Designed to Help Middle School Students Understand Chemical Reactions in Living Systems*
Cari F. Herrmann Abell, AAAS/Project 2061, cabell@aaas.org
Jean C. Flanagan, AAAS Project 2061
Jo Ellen Roseman, AAAS Project 2061

**Strand 10: Curriculum, Evaluation, and Assessment**
***Science Assessment: Approaches and Issues***
8:30am – 10:00am, Room 314
**Presider:** David F. Treagust, Curtin University

*How Stable are Students' Understanding of Light Propagation and Visibility of Objects in Different Contexts?*
Hye-Eun Chu, Nanyang Technological University, hyeeun.chu@gmail.com
David F. Treagust, Curtin University

*Development and Validation of Instrument for Exploring High School Students' Conceptions of Science Assessment in Taiwan*
Min-Hsien Lee, National Central University, Taiwan, lee.minhsien@gmail.com
Tzung-Jin Lin, National Taiwan University of Science and Technology, Taiwan
Chin-Chung Tsai, National Taiwan University of Science and Technology, Taiwan

*Children's Perceptions on Primary Science Assessment*
Colette Murphy, Queen's University Belfast, c.a.murphy@qub.ac.uk

*Assessment of Student Reasoning in Control of Variables*
Lei Bao, The Ohio State University, bao.15@osu.edu
Shaona Zhou, China Central Normal University
Jing Han, The Ohio State University
Amy Raplinger, The Ohio State University
Kathleen M. Koenig, University of Cincinnati

**Strand 10: Curriculum, Evaluation, and Assessment**
***Symposium - Argument Focused Instruction and Science Proficiency***
8:30am – 10:00am, Grand Ballroom VI-A
**Presider:** Victor D. Sampson, Florida State University
**Presenters:**
Patrick J. Enderle, Florida State University, pje07@fsu.edu

Barry Golden, University of Tennessee
Jonathon Grooms, Florida State University
Joi P. Walker, Florida State University

**Strand 11: Cultural, Social, and Gender Issues**
***Poster Symposium - Identity and Science Education Research: Topics, Issues, and Trends***
8:30am – 10:00am, Grand Ballroom V-A
**Presider:** Maria Varelas, University of Illinois at Chicago
**Presenters:**
Megan Bang, University of Washington
Angela Calabrese Barton, Michigan State University
Philip L. Bell, University of Washington
Leah A. Bricker, University of Washington
Heidi Carlone, University of North Carolina at Greensboro
Alice Carvalho, Université de Montréal
Allison J. Gonsalves, Université de Montréal
Juanita Bautista Guerra, Michigan State University
Jennifer Hope, University of Missouri-St. Louis
Angela Johnson, St. Mary's College of Maryland
Justine M. Kane, Wayne State University
Hosun Kang, University of Washington
Audrey Lachaîne, Université de Montréal
Amanda Marin, Northwestern University,
Maria S. Rivera Maulucci, Barnard College
Elizabeth Rita Menig, University of Illinois at Chicago
Felicia M. Mensah, Teachers College Columbia University
Carole P. Mitchener, University of Illinois at Chicago
Tara B. O'Neil, University of Hawaii at Manoa
Eileen C. Parsons, University of North Carolina at Chapel Hill
Joe Polman, University of Missouri-St. Louis
Jrene Rahm, Université de Montréal
Gale A. Seiler, McGill University
Daniela Stellino, University of Illinois at Chicago,
Edna Tan, University of North Carolina at Greensboro
Katie Van Horne, University of Washington

**Strand 11: Cultural, Social, and Gender Issues**
***Symposium - Perspectives from the Frontline: Examining African-American Students Matriculation into Science***
8:30am – 10:00am, Grand Ballroom V-B
**Presenters:**
Bryan A. Brown, Stanford University, brbrown@stanford.edu
Christopher Emdin, Teachers College Columbia University

## Wednesday, March 28, 2012

Andre M. Green, University of South Alabama
Christopher G. Wright, T.E.R.C

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

**Publications Advisory Committee Sponsored Session**
***Symposium - The Anatomy of a Good Article: Publishing in the Journal of Research in Science Teaching***
10:15am – 11:45am, Grand Ballroom V-A
**Presiders:**
Angela Calabrese Barton, JRST Editor; Michigan State University
Joseph S. Krajcik, JRST Editor; Michigan State University
Bob Geier, Assistant JRST Editor, University of Michigan

**Strand 1: Science Learning, Understanding and Conceptual Change**
***New Foundations for the Contribution of Prior Knowledge to Learning***
10:15am – 11:45am, Room 314
**Presider:** Michelle P. Cook, Clemson University

*The Use of Construct Maps to Explore Student Understanding of the Chemical Reaction Big Idea*
Nirit Glazer, University of Michigan, nirit@umich.edu

*Exploring the Relationship between Integrated Understanding of Energy and Preparation for Future Learning*
Jeffrey Nordine, Trinity University, jnordine@trinity.edu
Abigail Drake, Trinity University

*Attending to Individual Differences in the Instruction of Physics: The Role of Prior Knowledge*
Shulamit Kapon, Tel Aviv University, ISRAEL, kaponsh@post.tau.ac.il

*Eighth-grade Students' Mental Models of Magnetism: Modes of Agency and Mechanisms of Interaction*
David Sederberg, Purdue University, dsederbe@purdue.edu

**Strand 2: Science Learning: Contexts, Characteristics and Interactions**
***Elementary Science***
10:15am – 11:45am, Room 302
**Presider:** Bhaskar Upadhyay, University of Minnesota

*On Learning Ecology in Elementary Grades by Designing Robotic Animals and Their Habitats*
Gokul Krishnan, Vanderbilt University, gokul.krishnan@vanderbilt.edu
Pratim Sengupta, Vanderbilt University
Amanda C. Dickes, Vanderbilt University

## Wednesday, March 28, 2012

Amy Farris, Vanderbilt University

*The Use of Drawings to Evaluate the Impact of an Out of School Environmental Education Experience*
Michael W. Dentzau, Florida State University, mwd09c@my.fsu.edu
Alejandro J. Gallard, Florida State University

*The Effect of Instructional Framing on Learning and Transfer of Experimental Design Skills*
Stephanie Siler, Carnegie Mellon University, siler@cmu.edu
David Klahr
Kevin Willows
Cressida Magaro

*An Investigation of How Cogenerative Dialogues Affect the Culture of Learning in a Pre-Service Elementary Science Learning Environment*
Natan Samuels, Florida International University, nsamu002@fiu.edu
Renee Michelle Goertzen, Florida International University
Eric Brewe, Florida International University
Laird Kramer, Florida International University

**Strand 2: Science Learning: Contexts, Characteristics and Interactions**
***Middle Grades Science***
10:15am – 11:45am, Room 311
**Presider:** Noemi Waight, University at Buffalo

*Can Science Inquiry Instruction Really Enhance 8th Graders' Inquiry Competency and Self-efficacy?*
Ching-Wei Tung, Lu-Kang Junior High School, Taiwan, snailms@gmail.com
Hsiao-Lin Tuan, National Changhua University of Education
Chi-Chin Chin, National Taichung University of Education

*Personal and Contextual Factors as Predictors of Homework Management and Procrastination in Science Courses*
Yasemin Tas, Ataturk University, tasyase@gmail.com
Semra Sungur, Middle East Technical University
Ceren Tekkaya, Middle East Technical University

*Measuring Students' Continuing Motivation*
David L. Fortus, Weizmann Institute of Science, david.fortus@weizmann.ac.il
Dana Vedder Weiss, Weizmann Institute ofScience

*Background Demographic Characteristics: Predictors of Parent Attitudes Toward and Expectations of Middle Shcool Science?*
Leigh K. Smith, Brigham Young University, leigh_smith@byu.edu
Erika Feinauer, Brigham Young University
Erin F. Whiting, Brigham Young University

## Wednesday, March 28, 2012

Pamela Cantrell, Brigham Young University

**Strand 2: Science Learning: Contexts, Characteristics and Interactions**
***Symposium - Models in Science Education: Providing Foundation, Structure & Substance for Content Knowledge, Practice & Epistemology***
10:15am – 11:45am, Grand Ballroom VI-A
**Presider:** Julia Svoboda, University of California, Davis
**Discussant:** Brian J. Reiser, Northwestern University
**Presenters:**
Julia Svoboda, University of California, Davis, jmsvoboda@ucdavis.edu
Cynthia Passmore, University of California-Davis
Michael Ford, University of Pittsburgh
Melissa Braaten, University of Wisconsin
Leema Berland, University of Texas, Austin

**Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies**
***Enhancing the Understanding of NOS***
10:15am – 11:45am, Room 303
**Presider:** Tamara H. Nelson, Washington State University Vancouver

*The Effect of Educational Fieldtrips to Professional Research Labs on Students' NOS Understanding*
Dina Tsybulskaya, The Hebrew University of Jerusalem, dina.tsybulsky@mail.huji.ac.il
Jeff Dodick, The Hebrew University of Jerusalem
Jeff Camhi, The Hebrew University of Jerusalem

*The Effect of Explicit-Embedded-Reflective Instruction on Understandings of Advanced Students about Nature of Science*
Mustafa S. Koksal, Inonu University, bioeducator@gmail.com
Jale Cakiroglu, Middle East Technical University
Omer Geban, Middle East Technical University

*Exploring the Nature of Science through an Online Digital Game*
Isha DeCoito, York University, idecoito@edu.yorku.ca
Maurice DiGiuseppe, University of Ontario Institute of Technology

*A Comparative Case Study of Two High School Biology Teachers' Evolution and Nature of Science Teaching Practices*
Lisa A. Donnelly, Kent State University, ldonnell@kent.edu

## Wednesday, March 28, 2012

**Strand 5: College Science Teaching and Learning (Grades 13-20)**
***Exploring Different Types of Science Learning and Teaching***
10:15am – 11:45am, Room 304
**Presider:** Janelle M. Bailey, University of Nevada, Las Vegas

*Teaching Experiences for Researchers*
Anne W. Collins, University of California, Santa Barbara, anne.wrigley@gmail.com

*Connections to the K-12 Community that Shape the Career of Future Science Educators: A Longitudinal Study of Former Participants in a GK-12 Program*
Molly S. Bolger, University of Arizona, mbolger@email.arizona.edu
Susan Kuner, Topaz Canyon Group, LLC
Doug Robinson, Topaz Canyon Group, LLC
Robert Crouch, Vanderbilt University
John A. Willis, The Brooks Besor Consultants, Inc.
Martha J. Willis, The Brooks Besor Consultants, Inc.
Jennifer A. Ufnar, Vanderbilt University
Virginia L. Shepherd, Vanderbilt University

*College Students' Perceptions of Inquiry Experiences in Science Laboratories*
Saed A. Sabah,saed_sabah@yahoo.com
Akram Al Basheer, Hashemite University, Jordan
Areej Barham, Hashemite University, Jordan
Merfat Fayez, Hashemite University, Jordan

*Review of Laboratory Learning in Undergraduate Chemistry Courses*
Hannah Sevian, University of Massachusetts Boston, hannah.sevian@umb.edu
Gavin W. Fulmer, National Science Foundation

**Strand 6: Science Learning in Informal Contexts**
***Innovations Cultivating STEM Disciplinary Knowledge***
10:15am – 11:45am, Room 305
**Presider:** James F. Kisiel, California State University, Long Beach

*Organizational Schemes as Aids for Understanding Astronomical Content*
Sandra T. Martell, National Science Foundation, smartell@uwm.edu
Jean Creighton, UWM Planetarium

*Adults' Perception of Learning as Inspired by Awe in Nature*
Tamara C. Coleman, Western Michigan University, tcoleman@lowellschools.com

*Museum Theater as a Learning Environment for Introducing Evolution*
Ayelet Baram-Tsabari, Technion
Ran Peleg, Technion - Israel Institute of Technology

## Wednesday, March 28, 2012

*STEM integration: Integrating Engineering to Enhance Science Learning*
Misun Park, University of Minnesota, parkx598@umn.edu
Younkyeong Nam, University of Minnesota
Tamara Moore, University of Minnesota
Gillian Roehrig, University of Minnesota

**Strand 7: Pre-service Science Teacher Education**
***Field Experiences as a Factor in Pre-service Teacher Development I***
10:15am – 11:45am, Room 306
**Presider:** J. Steve Oliver, The University of Georgia

*A Hidden Factor? Investigating the Impact Field Experience Hours on Science Teacher Attrition*
Charles B. Weeks, Arizona State University, cbweeks@asu.edu
Julie A. Luft, The University of Georgia

*Re-imaging Inquiry-Based Field-Experiences for Preservice Science Teachers*
Julie Angle, Oklahoma State University, julie.angle@okstate.edu
Donald P. French, Oklahoma State University

*A Comparison of Field and University Based Science Methods Courses' Impact on Preservice Teacher's Belief and Abilities to Design Instruction for Diverse Learners*
Anne P. Gatling, Merrimack College, gatlinga@merrimack.edu

**Strand 7: Pre-service Science Teacher Education**
***Identity formation and Self Efficacy in the Context of Reform***
10:15am – 11:45am, Room 312
**Presider:** Andrew W. Shouse, University of Washington

*Persistence of a Culture of Inquiry: Professional Development Schools and Preparation of Reform-based Science Teachers*
Jeffrey J. Rozelle, Syracuse University, jrozelle@syr.edu
Gail Richmond, Michigan State University

*Looking through Different Lenses: How Preservice Science Teachers Use Practice-Oriented Reflections to Negotiate Reform-Minded Identities*
Robert Danielowich, Adelphi University (Garden City/New York, NY), rdanielowich@adelphi.edu

*Enhance Preservice Teacher Self-efficacy through a Reform-based Science Methods Course*
Sanghee Choi, North Georgia College & State University, sc1122@att.net

## Wednesday, March 28, 2012

**Strand 8: In-service Science Teacher Education**
***Conceptions of Inquiry and the Nature of Science***
10:15am – 11:45am, Room 206
**Presider:** Carla C. Johnson, University of Cincinnati

*Elementary Education Teachers' interest in and Conceptual Knowledge of Science Process Skills*
Frackson Mimba, Southern Illinois University Carbondale, frackson@siu.edu
Erin Miles, Southern Illinois University Carbondale
Vivien M. Chabalengula, Southern Illinois University Carbondale

*Changing Identities and Evolving Conceptions of Inquiry through Teacher-Driven Professional Development*
Ben Van Dusen, University of Colorado Boulder, benvandusen@colorado.edu
Mike Ross, University of Colorado Boulder
Valerie Otero, University of Colorado Boulder

*Making Room for Play in the World of Kit-Based Science*
Maria S. Rivera Maulucci, Barnard College, Columbia University, mriveram@barnard.edu

*Examining the Progress Made on the Nature of Science Conceptions of Science and Elementary Teachers Exposed to an Astronomy Science Summer Camp*
Ayhan Karaman, Canakkale Onsekiz Mart University, akaraman@comu.edu.tr
Sezen Apaydin, Canakkale Onsekiz Mart University

**Strand 9: Reflective Practice**
***Curriculum Development, Teacher Beliefs, and Communities of Practice***
10:15am – 11:45am, Room 301

*Factors that Influence the Translation of Teachers' Self-efficacy in Teaching Science as Inquiry into Practice*
Nattida Promyod, University of Iowa, nattida-promyod@uiowa.edu
Soonhye Park, University of Iowa

*Using Reflective Inquiry to Uncover Perceptions and Beliefs about Transforming Instructional Practice*
Robbie L. Higdon, Clemson University, rhigdon@clemson.edu

*Pathways to Science Teaching and Curriculum Development: A Self-Study of Two Teachers' Experiences*
Megan Leider, Loyola University Chicago/St. Rita HS, meganleider@gmail.com
Elizabeth Coleman, Loyola University Chicago

*Developing Reflective Practitioners in Video Centered Communities of Practice (VCCOP)*
Kimberly Lebak, Richard Stockton College of New Jersey, kimberly.lebak@stockton.edu
Ron Tinsley, Richard Stockton College of New Jersey

## Wednesday, March 28, 2012

**Strand 10: Curriculum, Evaluation, and Assessment**
***Studies on Assessment Forms and Item Sequencing Effects***
10:15am – 11:45am, Room 308
**Presider:** Min Li, University of Washington

*Comparing Student Performances, Anxieties, and Preferences between Situated, Virtual Environment Assessments and Multiple-Choice Assessments*
Angela Shelton, Temple University, angi@temple.edu
Diane J. Ketelhut, University of Maryland

*The Impact of Blended Cyberlearning about Climate Change on Students and Teachers*
Cindy L. Kern, University of Nevada, Las Vegas, kernc2@unlv.nevada.edu
Kent J. Crippen, University of Florida
Heather J. Skaza, University of Nevada-Las Vegas
Peter G. Schrader, University of Nevada, Las Vegas
Nya Berry, Clark County School District
Jake Rollans, Clark County School District

*Item Sequencing Effects on the Measurement of Students' Biological Knowledge*
Meghan A. Rector, The Ohio State University, rector.43@buckeyemail.osu.edu
Dennis Pearl, The Ohio State University
Ross H. Nehm, The Ohio State University

**Strand 11: Cultural, Social, and Gender Issues**
***Symposium - Promoting Science among English Language Learners (P-SELL) Efficacy Study***
10:15am – 11:45am, Grand Ballroom V-B
**Presider:** Okhee Lee, University of Miami
**Discussant:** Sherry A. Southerland, Florida State University
**Presenters:**
Jaime Maerten-Rivera, University of Miami
Kimberly S. Lanier, University Of Miami
Brandon S. Diamond, University of Miami
Rose Elizabeth Rohrer, University of Miami
Georgina O. Lindskoog, University of Miami
Soyeon Ahn, University of Miami

## Lunch—On Your Own
## 12:00pm – 1:00pm

## Wednesday, March 28, 2012

## Concurrent Session #12
## 1:00pm – 2:30pm

**Presidential Sponsored Session**
***Symposium - The PISA Assessment Framework for Science in 2015***
1:00pm – 2:30pm, Room 313
**Presider:** Sharon Lynch, George Washington University
**Presenter:** Jonathan F. Osborne, Stanford, osbornej@stanford.edu

**Presidential Sponsored Session**
***Poster Symposium - Sandra K. Abell Institute for Doctoral Students Poster Symposium***
1:00pm – 2:30pm, Grand Ballroom V-A
**Presider:** Janet Carlson, BSCS

*Students' Learning from Deliberative Communications in Socio-Scientific Issues*
Birgitta Berne, University of Gothenburg Sweden, birgitta.berne@ped.gu.se

*Identification of Science Literacy Practices in Pre-Service and Practicing Teachers for Urban Youth*
Anna E. Hutchinson, University of Cincinnati, hutchiae@mail.uc.edu

*From Evaluation to Instructional Support: Changes in Secondary Science Preservice Teachers' Assessment Expertise*
Edward G. Lyon, University of California, Santa Cruz, EGEANEY@UCSC.EDU

*How do Elementary Teachers and Students with Known NOS Views Make Meaning of NOS Messages in Trade Books?*
Seema Rivera, State University of New York (SUNY) Albany, emailseema@gmail.com

*From "Teaching the Textbook" to Focusing on "Big Ideas" in an Introductory Undergraduate Biology Course*
Masha Tsaushu, Technion-Israel Institute of Technology, tmasha@gmail.com
Tali Tal, Technion-Israel Institute of Technology
Shimon Gepstein, Technion-Israel Institute of Technology

*Elementary Teachers' Ideas about, Planning for, and Implementation of Learner-Guided and Teacher-Guided Inquiry*
Mandy Biggers, University of Iowa, mandy-biggers@uiowa.edu
Cory T. Forbes, University of Iowa

*Investigating Teacher Beliefs about the Importance of Scientific Models through Professional Development*
Christopher Bogiages, University of South Carolina, cbogiages@gmail.com
Christine R. Lotter, University of South Carolina

## Wednesday, March 28, 2012

*Cultural Relevance in High School Biology - Exploring Students' Scientific Understandings and Dispositions*
Julie Brown, University of Florida, brownjc@ufl.edu

*Teaching Science to English Learners: A Case Study of an Experienced Science Educator*
Joseph Chee, UC Santa Cruz, jchee1@ucsc.edu

*Youth Action Research in the Science Classroom: Implications for Youth's Identity Work*
Elizabeth Coleman, Loyola University Chicago, ecoleman3@luc.edu

*Alternatively Certified Science Teachers' Perceptions of their Preparedness to Teach Urban Minority Students*
Patricia S. Dunac, Georgia State University, pdunac1@student.gsu.edu

*Exploration of Professional Learning Pathways of Senior Years Science Teachers: the Journey toward Science Literacy*
Nancy Grant, University of Manitoba, grantnm@mts.net

*Leveraging Students' Lived Experiences and Science Ideas*
Sara Hagenah, University of Washington, shagenah@uw.edu

*Teacher Candidates' Storied Identities and Their Learning to Become a Science Teacher*
Amal Ibourk, Michigan State University, ibourkam@msu.edu

*Pre-service High School Science Teachers' Selection and Implementation of Formative Assessment Tasks (FATs)*
Kemal Izci, University of Missouri-Columbia, kikrc@mail.missouri.edu

*What Neanings do Rural Students Place on STEM Careers when Exploring and Creating Career Videos?*
Meredith Kier, North Carolina State University, meredith_kier@ncsu.edu
Margaret R. Blanchard, North Carolina State University

*Pedagogical Content Knowledge and Content Knowledge of Pre-Service and In-Service Secondary Physics Teachers*
Sophie Kirschner, University Duisburg-Essen , sophie.kirschner@uni-due.de
Andreas Borowski, RWTH Aachen University
Hans E. Fischer, University of Duisburg-Essen

*Modeling Instruction: Success in Dissemination through Teacher Empowerment*
May Lee, University of Colorado at Boulder, may.lee@colorado.edu
Melissa Dancy, University of Colorado Boulder
Charles Henderson, Western Michigan University
Eric Brewe, Florida Internationl University

*Open Inquiry in the Urban Science Classroom*
Megan Leider, Loyola University Chicago, meganleider@gmail.com

## Wednesday, March 28, 2012

*Insights about Students' Knowledge of Natural Selection Concepts from Three High School Biology Teachers' Classes*
Margaret M. Lucero, University of Texas at Austin, mmlucero@mail.utexas.edu

*The Fundamentals of Literacy in Science: Teachers' Implementation of Literacy Practices in the Science Classroom*
Sara C. Heredia, University of Colorado at Boulder, Sara.Heredia@colorado.edu

*Understanding the Co-Development of Modeling Practice and Ecological Knowledge*
Eve I. Manz, Vanderbilt University, eve.i.manz@vanderbilt.edu

*Studying a Reconceptualized Instructional Model for Secondary Physics Education*
Michael Mastroianni, University at Albany, SUNY, mm187487@albany.edu

*Figured Worlds as a Lens of Understanding Girls' Identity in a Kindergarten Science Classroom*
Alicia McDyre, Pennsylvania State University, axd252@psu.edu

*Barriers to Developing Science Faculty Knowledge for Teaching: Identifying Gaps through Critical Review of the Literature*
Deepika Menon, University of Missouri, deepikamenon@mail.mizzou.edu

*What do Second Graders Notice? Examining Student Notebooks from a Problem-Based Learning Unit*
Eileen Merritt, University of Virginia, egm8e@virginia.edu
Catherine Brighton, University of Virginia
Christine Trinter, University of Virginia
Tonya Moon, University of Virginia
Kristen Whitlock, University of Virginia
Kris Wiley, University of Virginia
Peter Malcolm, University of Virginia

*Evolution of a K-5 Teacher Learning Community: Grappling With Ambitious Science Teaching Practices*
Mark Merritt, Pennsylvania State University, mdm35@psu.edu
Carla Zembal-Saul, Pennsylvania State University

*Supports for Engaging Students' Argumentation: The Role of Students' Everyday View and Teachers'* Questioning Scaffold
Ji yeong Mun, Ewha Womans University, Republic of Korea, ksljyl@ewhain.net
Sung-Won Kim, Woman's University, Republic of Korea

*Above the Fold: Headlining the Engagement of Teen Science News Journalists*
Jennifer Hope, University of Missouri-St. Louis, jmghope@gmail.com

*Engaging in Pedagogical Reasoning through the Work of Mentoring: A Case Study*
Shelly Rodriguez, University of Texas, Shelly.rodriguez@austin.utexas.edu

## Wednesday, March 28, 2012

*Desegregating Evolution within the Curriculum: Exploring Changes in Students' Epistemology and* Evolutionary Reasoning
Nancy Rose, Ohio University, nrose@laca.org

*Youth Participatory Action Research in Science through a Critical Race Theory Lens*
Takumi Sato, Michigan State University, tsato@msu.edu

*Argumentation as Collaborative Discourse: Productive Argumentation Moves in Elementary Classrooms*
Kari Shutt, University of Washington, shuttk@uw.edu

*Changes in Teachers' Culturally Congruent Instruction Over Three Years in a Professional Development Project*
Regina Sievert, Salish Kootenai College, regina_sievert@skc.edu
Joan Lafrance, Mekinak Consulting
Rod Brod, University of Montana-Missoula

*Revealing Undergraduates Conceptions of the Nature of Science in Ill-Structured Media Domains*
Michele Snyder, University at Albany, michele.snyder@clinton.edu

*It's (Not) Elementary: Experiences of Pre-Service Teachers in Science Classrooms*
Jessica Stephenson, Virginia Tech, Jesteph3@vt.edu
George Glasson, Virginia Tech

*Using Technology to Transform the Social Structure of the High School Physics Classroom*
Ben Van Dusen, University of Colorado, Boulder, Benjamin.VanDusen@Colorado.EDU

*Influence of PCK for Teaching Evolution on Student Outcomes In A Non-Majors' College Course*
Emily Walter, University of Missouri, emw2n4@mail.missouri.edu
Patricia Friedrichsen, University of Missouri

*Examining Student Collaboration when Using Web 2.0 Tools to Construct a Group Knowledge Artifact*
Jennifer Weible, Pennsylvania State University, jweeble@gmail.com

How School Environments Impact Elementary Science Instruction
Julianne A. Wenner, University of Georgia, jakent@uga.edu

*Supporting Secondary Biology Teachers in Their Use of Technology to Teach Genetics*
Regina Wragg, University of South Carolinawragg@biol.sc.edu

## Wednesday, March 28, 2012

**Strand 1: Science Learning, Understanding and Conceptual Change**
***Conceptual Understanding and Conceptual Change***
1:00pm – 2:30pm, Room 311
**Presider:** Shulamit Kapon, Tel Aviv University

*The Impact of using a Scaffolded Written Framework on Students' Conceptual Understanding*
Jeong-yoon Jang, University of Iowa, jeongyoon-jang@uiowa.edu
Brian M. Hand, University of Iowa

*Epistemic Network Analysis: An Alternative Analysis Technique for Complex STEM Thinking*
Cynthia M. D'Angelo, University of Wisconsin – Madison, cmdangelo@wisc.edu
Douglas B. Clark, ASU / Vanderbilt
David Williamson Shaffer, University of Wisconsin – Madison

*The Role of Metacognition in Students' Development of Explanatory Ideas of Magnetism*
Meng-Fei Cheng, University of Illinois at Urbana-Champaign, mcheng2@illinois.edu
David E. Brown, University of Illinois at Urbana-Champaign

**Strand 2: Science Learning: Contexts, Characteristics and Interactions**
***Strategies in Secondary Science***
1:00pm – 2:30pm, Room 302
**Presider:** Phillip Herman, University of Pittsburgh

*Supporting Reading in High School Science: Evidence that Explicit Strategy Instruction Increases Science Achievement*
Phillip Herman, University of Pittsburgh, pherman@pitt.edu
Kristen Perkins, Northwestern University
Peter S. Wardrip, University of Pittsburgh

*The Dissonance between Taiwanese High School Students' and Teachers' Conceptions of Learning Science and Conceptions of Science Assessment*
Tzung-Jin Lin, National Taiwan University of Science and Technology, tzungjinlin@gmail.com
Min-Hsien Lee, National Central University

*Exploring the Link between the Framing of Activity and the Conceptual Trajectory of an Idea*
Brett A. Criswell, Georgia State University, bcriswell@gsu.edu

*Co-Teaching and Co-Generative for Transforming Teacher Interpersonal Behaviour and Teacher-Students Interactions in Secondary Schools*
Yuli Rahmawati, yuli.chem@gmail.com
Rekha Koul
Darrell Fisher

## Wednesday, March 28, 2012

**Strand 2: Science Learning: Contexts, Characteristics and Interactions**
***Symposium - Re-imagining Context: Student-Generated Representations as Tools for Reasoning in Science***
1:00pm – 2:30pm, Grand Ballroom VI-A
**Discussant:** Megan Bang, University of Washington
**Presenters:**
Brian Gravel, Tufts University, brian.gravel@tufts.edu
Kristen B. Wendell, University of Massachusetts Boston
Christopher G. Wright, TERC
Joshua A. Danish, Indiana University
Asmalina Saleh, Indiana University

**Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies**
***Using Technology for Science Learning***
1:00pm – 2:30pm, Room 303
**Presider:** Josephine Shireen Desouza, Ball State University

*Edison Didn't Work Alone: A Case for Collaboration among Rural Middle School Science Students Using Digital Backpacks*
Jennifer J. Mohler-Geary, University of Cincinnati, mogy2001@yahoo.com
Maya Israel, University of Cincinnati

*Inquiry-Based Science and Technology Program for Female Middle School Students*
Hanna Kim,hkim13@depaul.edu

*What Makes for Effective Multimedia Simulations in Science Education? Outcomes from an Effectiveness Study*
Catherine E. Milne, New York University, cem4@nyu.edu
Jan Plass, New York University
Bruce Homer, Graduate Center, City University of New York
Trace Jordan, New York University
Ruth Schwartz, New York University
Elizabeth Hayward, New York University

**Strand 5: College Science Teaching and Learning (Grades 13-20)**
***Visual Representation and Science Learning***
1:00pm – 2:30pm, Room 304
**Presider:** Allison Ritchie, University of Toronto

*Subject Matter Content Knowledge and Representation Strategies of Physics Teachers: Biot-Savart Law and Ampère's Law*
Sharareh Majidi, University of Helsinki, Sharareh.majidi@helsinki.fi
Terhi Mäntylä, University of Helsinki

## Wednesday, March 28, 2012

*Comparing Physical and Virtual Manipulatives for Retention and Preparation for Future Learning of Science Concepts*
Amy Rouinfar, Kansas State University, rouinfar@phys.ksu.edu
Adrian C. Madsen, Kansas State University
N. Sanjay Rebello, Kansas State University
Sadhana Puntambekar, University of Wisconsin

*Categorizing Students' Kinds of Mental Representations during Problem Solving of Different Representational Task Formats*
Bashirah Ibrahim, Kansas State University, bibrahim@phys.ksu.edu
N. Sanjay Rebello, Kansas State University

*Using Student Learning Preferences to Specifically Augment Student Performance in an Introductory Biology Laboratory Course*
Martin G. Kelly, D'Youville College, Buffalo, NY, martink@dyc.edu

**Strand 6: Science Learning in Informal Contexts**
***Community Involvement in Science: Youth and Adults Participating in Scientific Practices***
1:00pm – 2:30pm, Room 305
**Presider:** Rita Hagevik, The University of North Carolina at Pembroke

*Community Science Experts: Putting Place at the Center*
Daniel Birmingham, Michigan State University, birming2@msu.edu
Angela Calabrese Barton, Michigan State University

*Getting Participants to Participate: Stimulating Unterest and Unvolvement among Participants in a Citizen Science Iinitiative*
Jennifer Borland, Rockman Et Al, jennifer@rockman.com
Aaron Price, AAVSO

*Community Youth as Socioscientific Activists: Visions for School Science Reform*
John L. Bencze, OISE, University of Toronto, larry.bencze@utoronto.ca
G. Michael Bowen, Mount Saint Vincent University
Shaun Chen, University of Toronto
Allison Ritchie, University of Toronto
Erin R. Sperling, OISE, University of Toronto

*Scientific Competencies and Learning in Online Discourse of a Citizen Science Project*
Aaron Price, AAVSO, aaronp@aavso.org
Hee-Sun Lee, University of California, Berkeley
Jennifer Borland, Rockman Et Al

## Wednesday, March 28, 2012

**Strand 7: Pre-service Science Teacher Education**
***Secondary Science Teacher Preparation***
1:00pm – 2:30pm, Room 306
**Presider:** Christiana Nkechi Omoifo, University of Benin

*The Mechanisms of Secondary Science Teacher Candidates' Learning to Teach*
Hosun Kang, University of Washington, hosunk@uw.edu
Charles W. Anderson, Michigan State University

*Preservice Secondary Science Teachers' Approaches to Teaching Inquiry Skills*
Byoung Sug Kim, Roosevelt University, bkim@roosevelt.edu
Yeon-A Son, Dankook University
Eun Kyung Ko, National-Louis University
Seok Jun Hong, Dankook University

*Preservice Secondary Science Teachers' Views on the Value and Role of Student Ideas*
Douglas B. Larkin, Montclair State University, larkind@mail.montclair.edu

*An Investigation of Secondary Science Teacher Candidates Discourse in the Context of Inquiry Investigations*
Danielle E. Dani, Ohio University, dani@ohio.edu
Helen M. Meyer, University of Cincinnati

**Strand 7: Pre-service Science Teacher Education**
***Topics in Environmental Education***
1:00pm – 2:30pm, Room 312
**Presider:** Julie Thomas, Oklahoma State University

*Cosmologies of Preservice Teachers: A Six-Year Study, With Comparisons to Cosmologies of Children*
Alice (Jill) A. Black, Missouri State University, ablack@missouristate.edu

*The Western Worldview vs. Environmental Education: Pre-service Teachers' Beliefs*
Darren D. Hoeg, University of Toronto, hoeg_darren@hotmail.com
Sarah Barrett, York University

## Wednesday, March 28, 2012

**Strand 9: Reflective Practice**
***Enhancing Students' Understanding and Empowerment***
1:00pm – 2:30pm, Room 301
**Presider:** Kim Charmatz, Daemen College

*Using an Understanding of Children for Science Lesson Design*
Jenny D. Ingber, Bank Street College of Education, jingber@bankstreet.edu
Margaret A. McNamara, Bank Street College of Education

*A Self-Study on Reframing Non-Science Majors' Fundamental Understandings about Scientific Inquiry and Scientists*
Gayle A. Buck, Indiana University Bloomington, gabuck@indiana.edu
Xinying Yin, Indiana University Bloomington
Pazit Koren, Hebrew University
Varda Bar, Hebrew University

*Building Bridges across the Borders: Elementary Student Conceptions of Science*
Erin A. Hashimoto-Martell, Boston College/Boston Public Schools, hashimer@bc.edu

*Environmental Action Projects: Exploring Community Partnerships and College Student Empowerment through Participatory Action Research*
Kim Charmatz, Daemen College, kcharmat@daemen.edu

**Strand 10: Curriculum, Evaluation, and Assessment**
***Inquiry Instruction and Curriculum***
1:00pm – 2:30pm, Room 308
**Presider:** Mehmet Aydeniz, The University of Tennessee

*A Comparative Analysis of K-12 Assessment Instruments of Students' Understandings about Scientific Inquiry*
Darin S. Munsell, Illinois Institute of Technology, munsdar@hawk.iit.edu
Norman G. Lederman, Illinois Institute of Technology

*Comparative Interactions of High School Biology Students Engaging Textbook Accounts and Narratives of Historical Experiments*
Matthew Kloser, Stanford University, mkloser@stanford.edu

*The Inclusion of the Main Features of Inquiry in Saudi 10th Grade Physics Textbooks*
Abdulaziz H. Alolah, King Saud University, Saudi Arabia, aalolah2@yahoo.com
Fahad S. Alshaya, King Saud University, Saudi Arabia
Saeed M. Alshamrani, King Saud University, Saudi Arabia

*How do we do Inquiry? Let us Count the Ways*
Daniel Z. Meyer, Illinois Institute of Technology, meyerd@iit.edu

## Wednesday, March 28, 2012

Joy Kubarek-Sandor, Illinois Institute of Technology
James Kedvesh, Illinois Institute of Technology
Cheryl Heitzman, Illinois Institute of Technology
Yaozhen Pan, Illinois Institute of Technology
Sima Faik, Illinois Institute of Technology

**Strand 10: Curriculum, Evaluation, and Assessment**
***Teachers' Knowledge and Practices***
1:00pm – 2:30pm, Room 314
**Presider:** Colette Murphy, Queens University Belfast

*Escalating the Validity of the Survey-Type Measure of Teachers' Pedagogical Content Knowledge using Think-Aloud Interviews*
Soonhye Park, University of Iowa, soonhye-park@uiowa.edu
Sae Yeol Yoon, Unviersity of Iowa
Jee Kyung Suh, Unviersity of Iowa

*Examining Secondary Science Teachers' Formative Assessment Practices Based on Video Analysis*
Min Li, University of Washington, Seattle, minli@uw.edu
Jim Minstrell, Facet Innovations Inc
Ruth A. Anderson, Facet Innovations Inc
Ting Wang, University of Washington, Seattle
Jennifer Quynn, University of Washington, Seattle

*Translation and Validation of the Epistemological Beliefs Scale with Preservice Teachers*
Yusuf Sulun, Mugla University, syusuf@mu.edu.tr
Aylin Cam, Mugla University
Mustafa S. Topcu, Mugla University
Gokhan Guven, Mugla University
Sertac Arabacioglu, Mugla University

*Factors Affecting Primary Science Teachers' Enactment of Formative Assessment: Reality and Professional Decision Making*
Poh Hiang Tan, National Institute of Education, pohhiang.tan@nie.edu.sg

**Strand 11: Cultural, Social, and Gender Issues**
***Symposium - Science Education for Diversity: An International Perspective***
1:00pm – 2:30pm, Grand Ballroom V-B
**Discussant:** Sibel Erduran, University of Bristol
**Presenters:**
Saouma B. Boujaoude, American University of Beirut, Lebanon, boujaoud@aub.edu.lb
Rola Khishfe, American University of Beirut, Lebanon
Sugra Chunawala, Homi Bhabha Centre for Science Education, India

SweeChin Ng, Tunku Abdul Rahman College, Malaysia
Ralf van Griethuijsen, Eindhoven University of Technology, The Netherlands
Perry den Brok, Eindhoven University of Technology, The Netherlands
Ayse Savran Gencer, Pamukkale University
Huseyin Bag, Pamukkale University
Alun Morgan, Exeter University, UK
Nasser Mansour, Exeter University, UK
Sahar Alameh, American University of Beirut
Michiel van Eijck, Eindhoven University of Technology, The Netherlands
SiewChee Choy, Tunku Abdul Rahman College, Malaysia

**Strand 14: Environmental Education**
***Poster Symposium - Climate Change Education for the Twenty-First Century***
1:00pm – 2:30pm, Grand Ballroom VI-B
**Presider:** Devarati Bhattacharya, University of Minnesota

*Collaborative Development of a climate change curriculum for classrooms in the Intermoutain west-The ICE-Net Project*
Anne Kern, University of Idaho, akern@uidaho.edu

*Global Climate Change Education: Advancing Student Knowledge through Teacher Education-The ASK Florida Project*
Anna Lewis, University of South Florida, arlewis@csl.usf.edu

*CYCLES: Teachers Discovering Climate Change from a Native Perspective*
Gillian Roehrig, University of Minnesota, roehr013@umn.edu

*Global Cimate Change for Teachers: An Online Professional Development Leading to Civic Engagement*
Mary Margaret Small, Clarkson University, mmsmall@clarkson.edu

*Date Enhanced Investigations for Climate Change Education-The DICCE Project*
Daniel Zalles, SRI International, daniel.zalles@sri.com

NCAR Research Experience for Teachers (RETI)
Lori Reinsvold, University of Northern Colorado, lori.reinsvold@unco.edu

*2010-2012 NASA Challenger Center Global Climate Change Award*
Annette Brickley, Challenger Center for Space Science Education, abrickley@clcofme.org

*Global Climate Change Education: Research Experiences, Teaching and Learning*
Mary Margaret Small, Clarkson University, mmsmall@clarkson.edu

*Improvements to AMS Pre-college Programs: Results of a Self-study on Datastreme Earth's Climate System*
James Brey, American Meteorological Society, brey@ametsoc.org

## Wednesday, March 28, 2012

*An Experimental Approach to Climate Change Professional Development*
Patricia D. Morrell, University of Portland, morel@up.edu
Kari O'Connell, Oregon State University

*Bringing Global Climate Change Education to Alabama Classrooms: The Auburn University GCCE Project*
Marllin Simon, Auburn University, msimon@physics.auburn.edu

*Climate Change Literacy: Analysis of Learning Gains in Formal Education Setting Using a Normed Evaluation Instrument*
Carol Mandryk, George Mason University, cmandry2@gmu.edu

## Concurrent Session #13
## 2:45pm – 4:15pm

**Research Committee Sponsored Session**
***Symposium - Framing Standards: Researching the Development & Implementation of the Next Generation Science Standards***
2:45pm – 4:15pm, Grand Ballroom V-A
**Presider:** Richard Duschl, Penn State University
**Discussants:**
Kathyrn Scantlebury, University of Delaware
Janice Earle, National Science Foundation
**Presenters:**
Stephen Pruitt, Achieve, Inc.
Brett Moulding, Utah State, Tidemark Inst.
James Pellegrino, University of Illinois - Chicago

**Strand 1: Science Learning, Understanding and Conceptual Change**
***Symposium - Towards a Learning Progression of Energy Procedures, and Pedagogical Issues to Reposition Literacy in Scientific Literacy***
2:45pm – 4:15pm, Room 311
**Presider:** Reinders H. Duit, Leibniz Institute for Science Education (IPN) Kiel
**Discussant:**
Charles W. Anderson, Michigan State University, andya@msu.edu
**Presenters:**
David L. Fortus, Weizmann Institute of Science
Joseph S. Krajcik, University of Michigan
Xiufeng Liu, State University of New York At Buffalo (SUNY)
Knut Neumann, Leibniz Institute for Science Education (IPN) Kiel

## Wednesday, March 28, 2012

**Strand 2: Science Learning: Contexts, Characteristics and Interactions**
***Diverse Learners***
2:45pm – 4:15pm, Room 302
**Presider:** Janell Nicole Catlin, Teachers College, Columbia University

*The Construction of Inquiry Questions in Project-based Small-group Scienctific Inquiry*
Jane J. Lee, Seoul National University, jane8207@gmail.com
Heui-Baik Kim, Seoul National University

*Factors Affecting whether Students in England Choose to Study Physics once the Subject is Optional*
Tamjid Mujtaba, Institute of Education, University of London, t.mujtaba@ioe.ac.uk
Michael J. Reiss, Institute of Education, University of London

*Science in the Inclusive Classroom: Addressing Students' Needs through a Multi-Dimensional Instructional Environment*
Ornit Spektor-Levy, ornitsl@gmail.com
Yafa Gonda-Keren
Merav Yifrach

*Promoting a Culture of Learning based on Internal Values in an Introductory Undergraduate Biology Course*
Ornit Sagy, Technion-Israel Institute of Technology, ornit_sagy@yahoo.com
Yael Kali, University of Haifa
Masha Tsaushu, Technion-Israel Institute of Technology
Tali Tal, Technion-Israel Institute of Technology
Dan Zilberstein, Technion-Israel Institute of Technology
Shimon Gepstein, Technion-Israel Institute of Technology

**Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies**
***Measuring and Exploring Teachers' PCK***
2:45pm – 4:15pm, Room 303
**Presider:** Isha DeCoito, York University

*Teacher Knowledge versus Teacher Practice: Reflecting on Classroom Instruction and Interaction through PCK-directed Observation*
Erik Barendsen, Radboud University Nijmegen, ILS-RU, e.barendsen@ils.ru.nl
Ineke Henze, Radboud University, Nymegen

*Further Examination of Interplay between Pedagogical Content Knowledge Components*
Sevgi Aydin, Yuzuncu Yil University, sevgi.aydin45@hotmail.com
Yezdan Boz, Middle East Technical University

*Comparison of Experienced Chemistry Teachers' Pedagogical Content Knowledge in Electrochemistry and Radioactivity*

Yezdan Boz, Middle East Technical University, yezdan@metu.edu.tr
Sevgi Aydin, Yuzuncu Yil University

*Examine The Discourse Pattern And Teacher's Pedagogies In Promotion Reasoning In Science Writing Heuristic Classroom*
Niphon Chanlen, University of Iowa, niphon-chanlen@uiowa.edu
Brian M. Hand, University of Iowa

*Measuring PCK for Teaching Chemical Equilibrium: A Comparison between Experienced Teachers and Pre-service Teachers*
Marissa S. Rollnick, Wits University, marissa.rollnick@wits.ac.za
Elizabeth M. Mavhunga, Wits University

**Strand 4: Science Teaching--Middle and High School (Grades 5-12): Characteristics and Strategies**
***Teacher Beliefs and Effects on Practice***
2:45pm – 4:15pm, Room 305
**Presider:** Catherine E. Milne, New York University

*Relationship between Teachers'Beliefs and Practice of Review Lesson and Student Learning*
Su Gao, University of Nevada, Las Vegas, gaos2@unlv.nevada.edu
Jian Wang, University of Nevada, Las Vegas

*Teachers Views of the Role of Literacy in Science*
Jonathan F. Osborne, Stanford University, osbornej@stanford.edu
Michael Metz, Stanford University
Alexis Patterson, Stanford University
Diego Xavier Roman, Stanford University

*Pre-service Science Teachers' Orientations toward Teaching: Evidence for Constancy and Ability across Subject Matter Knowledge Areas*
Vanessa Kind, Durham University, UK, vanessa.kind@durham.ac.uk

*Science Teachers' Beliefs about the Influence of their Summer Research Experiences on their Pedagogical Strategies*
Rommel Miranda, Towson University, Rmiranda@towson.edu
Julie Damico, Towson University

*Secondary Science Teacher Beliefs about Talk during Whole-Class Discussions*
Diane Silva Pimentel, Boston College, silvadi@bc.edu
Katherine L. McNeill, Boston College

## Wednesday, March 28, 2012

**Strand 5: College Science Teaching and Learning (Grades 13-20)**
***Science and Graphic Representations***
2:45pm – 4:15pm, Room 304
**Presider:** Linda Keen-Rocha

*Investigating the Value of Multi Modal Representation Instruction on Learning Physics Concepts*
Murat Gunel, Ahi Evran University, mgunel@ahievran.edu.tr
Cuneyt Ulu, Marmara University

*Understanding the Conventions Undergraduate Students Follow or Break When Constructing Scales for Graphs*
Margaret M. Lucero, The University of Texas at Austin, mmlucero@mail.utexas.edu
Cesar Delgado, The University of Texas at Austin

*Students' Use of Covalent Bond Model to Represent Ionic Bonds: Insights from Particulate Drawing Task*
Abdi M. Warfa, University of Minnesota, moham489@umn.edu
James M. Nyachwaya, University of Minnesota
Gillian Roehrig, University of Minnesota
Jamie L. Schneider, University of Wisconsin River Falls

*Using Diagrams in Conjunction with Clicker-questions in Large Lecture Biology Courses to Enhance Student Learning*
Johanna M. Fitzgerald, UMass-Amherst, johfitz@yahoo.com
J.Z. Barlow, UMass-Amherst
Randall Phillis, UMass-Amherst

**Strand 7: Pre-service Science Teacher Education**
***Preservice Teachers' Understandings and Perceptions of the Nature of Science***
2:45pm – 4:15pm, Room 306
**Presider:** G. Michael Bowen, Mount Saint Vincent University

*A Case Study of a Pre-Service Science Teacher's Practice of NOS Teaching and Argumentation*
Yasemin Ozdem, Gaziosmanpasa University, yozdem@metu.edu.tr
Kader Bilican, Ataturk University

*Investigating use of Self-efficacy Sources in Improving Preservice Science Teachers' Self-efficacy Beliefs Regarding Teaching Nature of Science*
Kader Bilican, Ataturk University
Jale Cakiroglu, Middle East Technical University

*Assessing Student Learning from a PBL Approach: Comparing Pre-Service Science Teachers to Undergraduate Science Students*
Sharon Schleigh, East Carolina University, schleighs@ecu.edu
Alex Manda, East Carolina University

## Wednesday, March 28, 2012

**Strand 7: Pre-service Science Teacher Education**
***Developing Pre-Service Teachers' Content Knowledge***
2:45pm – 4:15pm, Room 312
**Presider:** Douglas B. Larkin, Montclair State University

*Examining the Role of Content Knowledge in Learning to Teach Science: Implications for Teacher Preparation*
Gail Richmond, Michigan State University, gailr@msu.edu

*Exploring the Teacher-Researcher Model for Impacts on Pre-service Teachers' Preparation for Science and Math Teaching*
Bryan M. Rebar, California Polytechnic State University, brebar@calpoly.edu
John M. Keller, California Polytechnic State University
Collie Conoley, University of California, Santa Barbara

*Science Student Teachers' Struggles with and Learning about Classroom Action Research During Their Field Experiences*
Chatree Faikhamta, Kesetsart University, chatreechem@yahoo.com
Anthony Clarke, University of British Columbia

**Strand 8: In-service Science Teacher Education**
***Promoting Project-Based Science Teaching***
2:45pm – 4:15pm, Room 206
**Presider:** Christine R. Lotter, University of South Carolina

*The Impact of an Immersion Course on In-Service K-8 Teachers Implementation of Reformed Teaching Practices in the Classroom*
Margaret D. Nolan, Boston University, noland@mersd.org
Peter Garik, Boston University
Charles Winrich, Boston University
Nicholas Gross, Boston University

*Developing Science Teacher Leaders to Facilitate the Implementation of Project-Based Science in Schools: Preliminary Findings*
Gale A. Mentzer, Grant Fundamentals LLC, gale@grantfundamentals.com
Janet Struble, The University of Toledo

*Educative Curriculum Materials that Allow for Learned Adaptations: Ensuring Quality of Implementation*
Barbara Hug, University of Illinois at Urbana-Champaign, bhug@illinois.edu
Tania Jarosewich, Censeo Group LLC
Donna Korol, University of Illinois at Urbana-Champaign

## Wednesday, March 28, 2012

**Strand 10: Curriculum, Evaluation, and Assessment**
***Assessment and Evaluation***
2:45pm – 4:15pm, Room 308
**Presider:** Alan K. Szeto, Purdue University Calumet

*Effect of Order of Concept Introduction on Secondary Honors Students' Understanding of Chemistry*
John C. Scali, University of Delaware, Newark, john.scali@bsd.k12.de.us

*Research-Based Shift from Algorithmic Teaching to 'HOCS Learning' Science - for a Diverse Global Community*
Uri Zoller, Haifa University, uriz@research.haifa.ac.il
Naji Kortam, Haifa University
Tami Levy Nahum, Haifa University
Ibtesam Azaiza, Haifa University
David Ben-Chaim, Haifa University

*Where are the People? Understanding Representations of Society-Nature Relationships in State Science Standards in United States*
Ajay Sharma, University of Georgia, ajay@uga.edu
Cory A. Buxton, University of Georgia

*Designing Effective Science Achievement Measures for Intervention Studies with English Language Learners*
Jerome M. Shaw, University of California, Santa Cruz, jmlshaw@ucsc.edu
Edward G. Lyon, University of California, Santa Cruz
Joseph Chee, University of California, Santa Cruz

## NARST Executive Board Meeting #3
5:00pm – 10:00pm, Grand Ballroom 7