

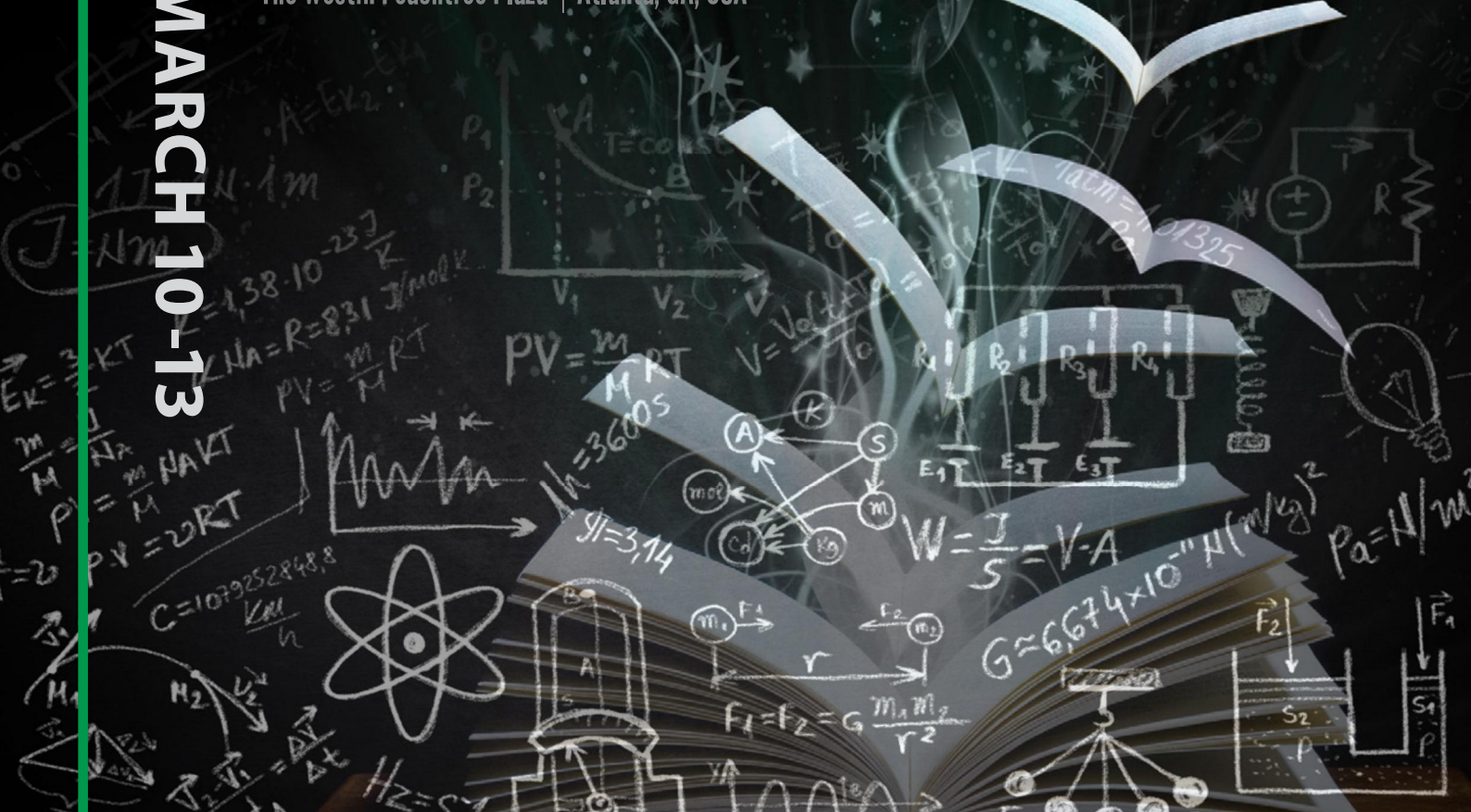
**NARST 91st** Annual International Conference **2018**



# Re-Centering on Scientific Literacy in an Era of Science Mistrust and Misunderstanding

The Westin Peachtree Plaza | Atlanta, GA, USA

**MARCH 10-13**



## Strand Key

STRAND 1 – Science Learning: Understanding and Conceptual Change  
STRAND 2 – Science Learning: Contexts, Characteristics, and Interactions  
STRAND 3 – Science Teaching – Primary School (Grades preK-6): Characteristics and Strategies  
STRAND 4 – Science Teaching – Middle and High School (Grades 5-12): Characteristics and Strategies  
STRAND 5 – College Science Teaching and Learning (Grades 13-20)  
STRAND 6 – Science Learning in Informal Contexts  
STRAND 7 – Pre-service Science Teacher Education  
STRAND 8 – In-service Science Teacher Education  
STRAND 9 – Reflective Practice  
STRAND 10 – Curriculum, Evaluation, and Assessment  
STRAND 11 – Cultural, Social, and Gender Issues  
STRAND 12 – Educational Technology  
STRAND 13 – History, Philosophy, and Sociology of Science  
STRAND 14 – Environmental Education  
STRAND 15 – Policy

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• **Making Time for Science Reading: The News Is Good**

**Presenter(s):** Billy McClune (Queen's University Belfast: Belfast, United Kingdom)

• **Understanding Crosscutting Concepts in 3-D Science Learning: Strategies for Designing Lessons and Assessments**

**Presenter(s):** Ann Rivet (Teachers College, Columbia University: New York, NY), Xiaoxin Lyu (Teachers College, Columbia University: New York, NY), Diego Rojas-Perilla (Teachers College, Columbia University: New York, NY)

• **Investigating and Designing Paper Airplanes**

**Presenter(s):** Augusto Macalalag, Jr. (Arcadia University: Glenside, PA), Joseph Johnson (Mercyhurst University: Erie, PA), Angela Keeley (Lower Merion School District: Ardmore, PA)

• **I AM STEM: Transforming the Face of STEM One Community at a Time**

**Presenter(s):** Natalie King (Georgia State University: Atlanta, GA)

• **Biology Alternative Conceptions and Your Students**

**Presenter(s):** Caroline Longo (Ohio State University: Columbus, OH), Andria Stammen (Ohio State University: Columbus, OH), Lin Ding (Ohio State University: Columbus, OH), Anita Schuchardt (University of Pittsburgh: Pittsburgh, PA), William Boone (Miami University: Oxford, OH), Zakee Sabree (Ohio State University: Columbus, OH)

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***The Classroom Community: What Students, Faculty and Learning Assistants are doing in the Active Learning Class***

Laurel Hartley, University of Colorado, Denver  
 Leanne Doughty, University of Colorado, Denver  
 Paul Le, University of Colorado, Denver  
 Amreen Nasim Thompson, University of Colorado, Denver  
 Robert M. Talbot, University of Colorado, Denver

***The Classroom Community: How Student Interaction Relates to Outcomes***

Paul Le, University of Colorado, Denver  
 Robert M. Talbot, University of Colorado, Denver  
 Andrew L. McDevitt, Illinois State University  
 Laurel Hartley, University of Colorado, Denver  
 Amreen Nasim Thompson, University of Colorado, Denver  
 Leanne Doughty, University of Colorado, Denver

***Strand 6: Science Learning in Informal Contexts Reimagining STEM Through Theatre: A Cross-Disciplinary Science-Theatre Project for Middle School Youth***

2:40pm – 4:10pm, Augusta B

**Presenters:**

Ariella F. Suchow, Boston College  
 Megan T. McKinley, Boston College  
 Amy R. Semerjian, Boston College  
 Helen Zhihui Zhang, Boston College  
 Mike Barnett, Boston College

***Strand 7: Pre-service Science Teacher Education Argumentation***

2:40pm – 4:10pm, Augusta G

**President:** Meenakshi Sharma, Michigan State University

***From Didactic to Dialogical Teaching – Intervention to Foster Scientific Argumentation in Ethiopian Teacher Education***

Vanessa Kind, Durham University  
 Per Morten Kind, Durham University  
 Mulugeta Atnafu, Addis Ababa University  
 Kassa Michael, Addis Ababa University  
 Mekbib Alemu, Addis Ababa University  
 Mesfin Tadesse, Addis Ababa University

***Pre-service Teachers' use of Discourse to Control the Construction of Scientific Arguments***

Brent Gilles, University of West Georgia  
 Gayle A. Buck, Indiana University

***The Impact of Socio-Scientific Biology Instruction on Argumentation Skills of Pre-service Science Teachers***

Yilmaz Kara, Bartin University  
 Gozde Yalcin, Bartin University

***Strand 7: Pre-service Science Teacher Education Mentoring***

2:40pm – 4:10pm, Savannah B

**President:** Michelle Forsythe, Texas State University

***Digital Community of Practice: What Do Veteran Teachers Talk About?***

Susan P. Unger, University of Rhode Island  
 Jay A. Fogleman, University of Rhode Island  
 Sara B. Sweetman, University of Rhode Island

***Mind the Gap: Exploring (Mis)alignment in In-service and Pre-service Science Teacher Mentoring Relationships***

Alison R. Miller, Bowdoin College  
 Laura Zangori, University of Missouri  
 Brooke A. Whitworth, University of Mississippi  
 Mandy Biggers, Texas Woman's University

***Promoting Science Teacher Candidate Learning through Content-Specific Disciplined Inquiry***

Danielle E. Dani, Ohio University

***The Triad Project: A Professional Development Activity System for Teaching to the NGSS***

Al Schademan, California State University, Chico  
 Mimi Miller, California State University, Chico  
 Tal Slemrod, California State University, Chico

***Strand 8: In-service Science Teacher Education Conceptions of Engineers and Engineering***

2:40pm – 4:10pm, Augusta E

**President:** Emily A. Dare, Michigan Technological University

***Exploring Teacher-Engineer Partnerships in Professional Development in the Time of NGSS***

Emily A. Dare, Michigan Technological University

***Identifying Teachers' Conceptions of Engineering and Teaching Engineering***

Shannon M. Smith, University of Cincinnati  
 William H. Thatcher, University of Cincinnati  
 Helen Meyer, University of Cincinnati

## ***The Impact of Socio-scientific Biology Instruction on Argumentation Skills of Preservice Science Teachers***

Yilmaz Kara, Bartin University

Gozde Yalcin, Bartin University

### **ABSTRACT:**

The study was aimed to determine how instruction driven by socio-scientific biology instruction over a semester period influenced PST's argumentation skills. One-group research design guided the study. The participants were 35 pre-service science teachers (PST) at their senior year. Treatment was the biology instruction based on socioscientific approach. The instruction continued in the course of Special Issues in Biology and lasted in sixteen weeks. In order to examine PST's argumentation skills, argumentative questions were developed for each week. The instrument included the written questions exploring students' views about the role of SSI-based instruction. Students' argumentation skills were explored and scored depending on the rubric developed according to Toulmin Argumentation Pattern, the rubric focused on the students' argumentation structure. The results suggest that SSI-based instruction significantly influenced participants' argumentation skills. Specifically, our results suggest that while students encounter SSI-based instruction, their argumentation skills increase positively. The results indicate that teachers would benefit from SSI-based learning experiences that support their argumentation practices as well as their ability to foster development of these practices among their students. Keywords: Argumentation skills, Socioscientific issues, Teacher education.

### **Strand 7: Pre-service Science Teacher Education**

#### ***Mentoring***

2:40pm-4:10pm, Savannah B

**Presenter:** Michelle Forsythe, Texas State University

### ***Digital Communities of Practices: What do Veteran Teachers Talk About?***

Jay A. Fogleman, University of Rhode Island

Sara B. Sweetman, University of Rhode Island

#### **ABSTRACT:**

Communities of Practice (CoPs) have been suggested as a way of exchanging ideas, sharing resources, and supporting fledgling efforts of novice learners (Wenger, 1998). Digital CoPs offer affordances of being unbound by geographical (Hanson-Smith, 2013) and time constraints (Vavassuer & MacGregor, 2008). This research analyzes entries of a voluntary public Twitterfeed, an ongoing digital CoP by practicing teachers and other stakeholders of the GEMS-Net community to answer the question "What do veteran teachers of a CoP talk about"? Data were analyzed using guidelines by Richards (2015). Tweets were analyzed by organizing text, supported by image and video, into nine coded themes. Themes were further grouped into four subgroups of coding families. Results suggested that participants of the @gemsnet10 Twitterfeed discuss (a) disciplinary core ideas, crosscutting concepts, or science and engineering practices as defined by Next Generation Science Standards (43%), (b) sharing resources or pedagogical methods (24%), (c) showcasing student work or rights of students (19%), and (d) acknowledgement of their own and others' achievements in the classroom (14%). This research suggests that inviting pre-service teachers to participate in an ongoing CoP may support their efforts as novice teachers, since entries of veteran teachers seemed relevant to the practice of science education.

### ***Mind the Gap: Exploring (Mis)alignment in Inservice and Preservice Science Teacher Mentoring Relationships***

Alison Z. Miller, Bowdoin College

Brooke A. Whitworth, University of Mississippi

Mandy Biggers, Texas Woman's University

#### **ABSTRACT:**

Despite the critical role that inservice teachers play in the preparation of preservice teachers (PSTs), there are few guidelines across state programs for qualifications and development of these mentors. Furthermore, there is little research available around what factors make for a positive and educative mentoring relationship. This attention around alignment of PSTs and mentor teachers' pedagogical commitments is particularly critical as education programs seeking to prepare PSTs for NGSS-aligned teaching. This qualitative study first explores how inservice mentor science teachers are selected across PST programs in two states. Next, we sample and interview PST-mentor inservice teacher pairs to characterize the pedagogical alignment, or misalignment, for the mentoring relationship and teaching with the NGSS. Our results indicate that in the absence of state-level policy, teacher preparation programs for inservice mentor teacher selections vary widely. Among interviewees, both PST and mentor teachers characterized the mentoring relationship as positive or negative based on personal compatibility, and not on content and/or standards. Overall, our findings indicate that teacher preparation programs require support in determining the roles and responsibilities of both PSTs and mentor teachers