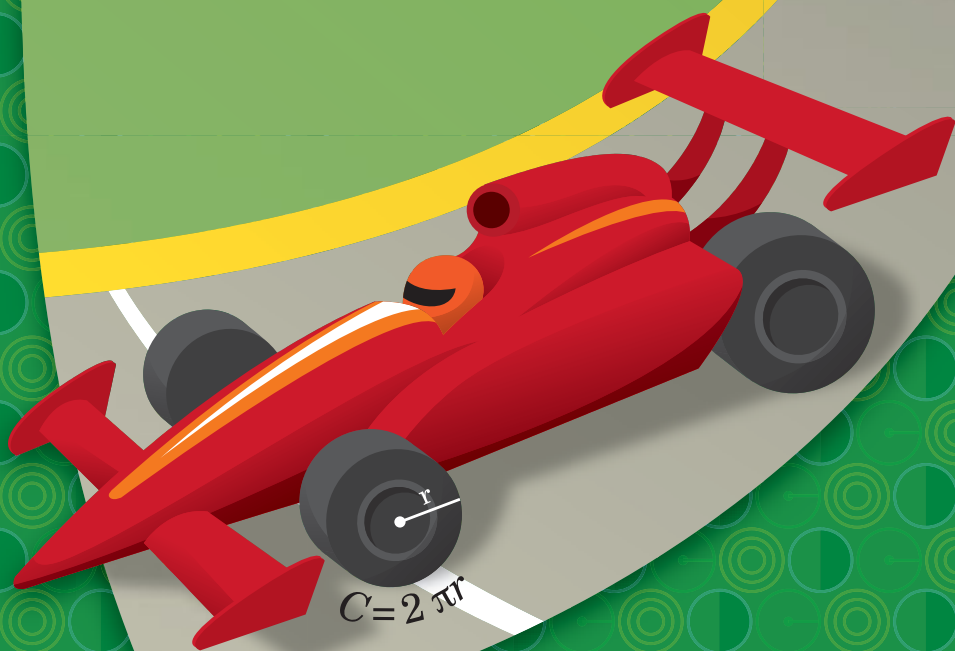


# PROGRAM FOR THE Research Preession April 11–13, 2011



NATIONAL COUNCIL OF  
TEACHERS OF MATHEMATICS

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# Research Pre-session Planning Committee

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**Communications**

*City University of New York—City College*

## Announcements

- The Research Pre-session will be held at the Indiana Convention Center.
- Registration will be held in the 2nd Floor Serpentine Lobby. The times are Monday, 4:30 p.m. to 7:00 p.m., and Tuesday, 7:00 a.m. to 3:00 p.m. Registration is required for attendance, and badges must be worn for all sessions.
- On Wednesday, the Research Pre-session is open to all registered attendees at the NCTM Annual Meeting and the NCSM Annual Conference. Badges from these conferences will be required for attendance for all sessions on Wednesday.
- A light reception will be held on Monday evening in the Sagamore Ballroom Lobby from 8:30 p.m. to 10:00 p.m., following the opening session at 7:00 p.m. in Sagamore 4.
- Research posters will be available for viewing and discussing with the presenters in the 2nd Floor Serpentine Lobby on Monday from 5:15 p.m. to 6:30 p.m. and Tuesday from 4:45 p.m. to 6:00 p.m.
- This year, NCTM partnered with NCSM to allow NCSM attendees to attend NCTM's opening session Monday night. NCTM Research Pre-session attendees can attend NCSM's session, titled "Understanding the Influence of the Common Core Standards in Mathematics: What Do We Need to Know and When Do We Need to Know It?" on Wednesday from 2:45 p.m. to 4:15 p.m., Indianapolis Marriott Downtown, Grand Ballroom 6.
- Be sure to visit the NCTM Bookstore, which has a special table on research, in the Exhibit Hall on Wednesday.
- The Call for Papers for the next Research Pre-session, to be held in Philadelphia, Pennsylvania in 2012, will be available online in June 2011.

## Interactive Paper Sessions



**NEW**

Interactive paper sessions replace individual and roundtable sessions as the format for findings presentations from completed work. Each session will involve individual papers, grouped by the program planning committee around a common theme. For each paper, the speaker(s) will give a 10-minute overview presentation of the study to the entire audience then engage in two roundtable breakouts to stimulate discussion with small groups of participants. The session will conclude with remarks from a discussant selected by the program planning committee.

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The publications and programs of the National Council of Teachers of Mathematics present a variety of viewpoints. The views expressed or implied in this publication, unless otherwise noted, should not be interpreted as official positions of the Council. Reference to particular commercial products by a speaker should not be construed as an NCTM endorsement of said product(s). NCTM reserves the right to change speakers, change facilities, or modify program content.

## Invited Sessions

### Opening Session

28. **Maintaining Ambitious Teaching: Constraints, Affordances of Schools, Professional Education, Policy**

Monday, April 11, 7:00 p.m.–8:30 p.m.

Sagamore 4

29. **Differentiating Instruction to Meet All Students' Needs: Bringing Research and Practice Together**

Tuesday, April 12, 8:30 a.m.–10:00 a.m.

201

62. **National Science Foundation (NSF) and Mathematics Education: Past, Present, and Future**

Tuesday, April 12, 3:00 p.m. – 4:30 p.m.

201

### Plenary Session

102. **Toward an Empirically Grounded Theory of Action for Improving Mathematics Teaching Quality at Scale**

Wednesday, April 13, 8:30 a.m.–10:00 a.m.

Sagamore 4

105. **Research in Statistics Education: Current Efforts and Future Directions**

Wednesday, April 13, 10:30 a.m.–12:00 noon

203

110. **The High-School-to-College Mathematics Transition: Challenges and Prospects**

Wednesday, April 13, 10:30 a.m.–12:00 noon

Sagamore 4

121. **Research Opportunities Arising from the Standards for Mathematical Practice**

Wednesday, April 13, 1:00 p.m. –2:30 p.m.

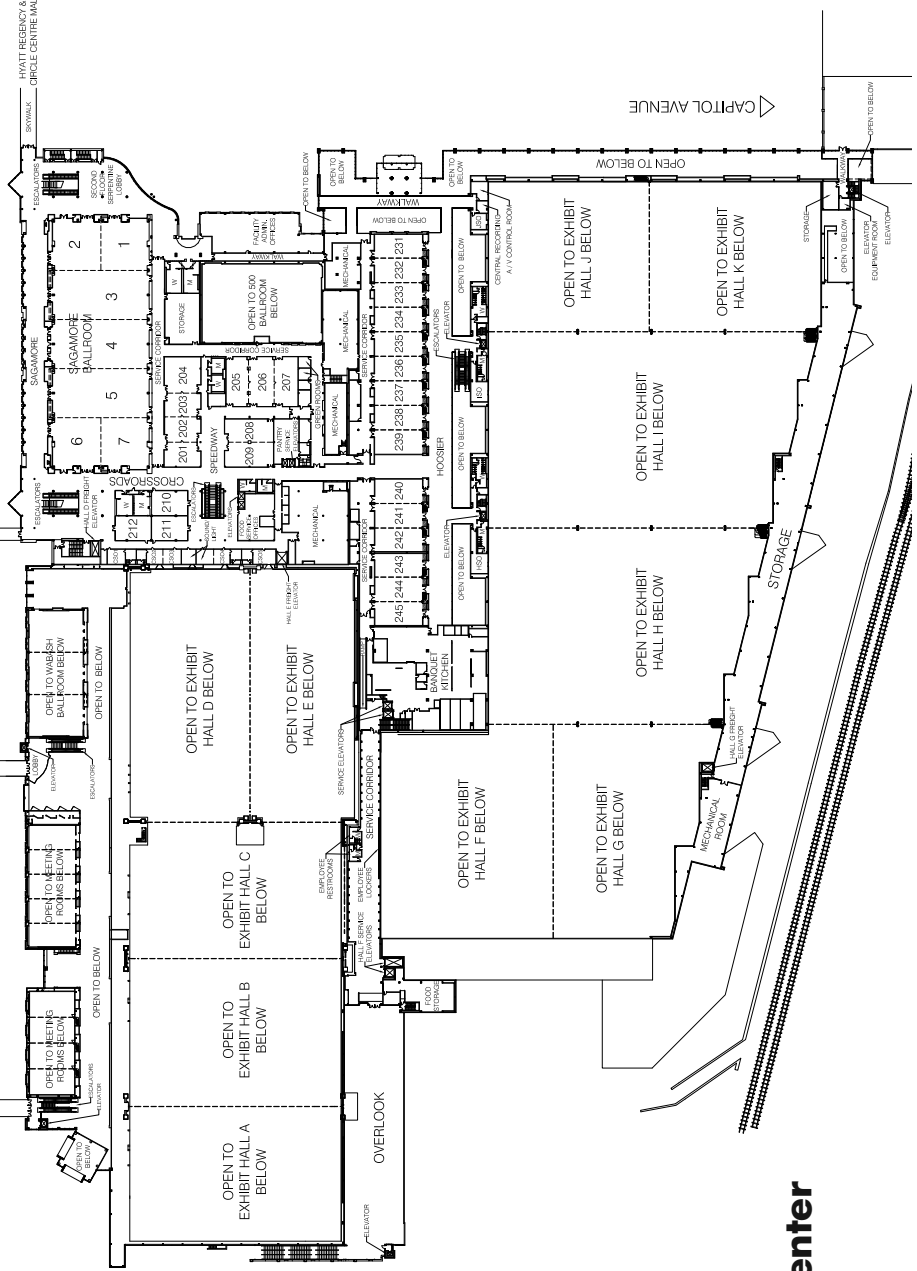
Sagamore 4

132. **Research on Technology in Mathematics Education: Current Efforts and Future Directions**

Wednesday, April 13, 3:00 p.m. –4:30 p.m.

Sagamore 4

**All sessions in Indiana Convention Center.**



# Floor Plan

## Indianapolis Convention Center

### Second Floor

On behalf of the Research Committee of the National Council of Teachers of Mathematics (NCTM) and the Special Interest Group/Research in Mathematics Education (SIG/RME) of the American Educational Research Association (AERA), we welcome you to NCTM's Research Pre-session. The Research Pre-session serves multiple purposes. First, it brings researchers together annually to examine and discuss current issues in mathematics education. Second, it is an opportunity for researchers to receive feedback on their work and to benefit from exposure to alternative points of view. Third, it affords beginning scholars opportunities to interact and network with veteran researchers in the field. Finally, it is an opportunity to capitalize on the collective wisdom available when researchers and practitioners come together to discuss mathematics education and research.

We would like to thank the members of NCTM's Research Committee, members of the executive board for the SIG/RME, and other members of the research community who served as reviewers. Your work is greatly valued and appreciated. Moreover, we would like to thank the staff at NCTM for helping us with the logistics of the conference, registration, printing the program, and so on. Also, we would like to thank all the presenters for agreeing to participate. Finally, we would like to thank everyone in attendance, and we hope that you will find the conference helpful to you in a number of ways.

Sincerely,

Dorothy Y. White,  
NCTM Research Committee, Chair

Jinfa Cai,  
AERA SIG/RME Cochair

David E. Barnes,  
NCTM Research Committee, Staff Liaison

Karen King,  
NCTM Director of Research

## 1

### **Abstracting Mathematics Principles from Korea and Singapore for Professional Development**

#### Poster Session

Two groups of elementary school teachers abstracted principles from Singapore Mathematics and the Korean national curriculum's Gecko Mathematics. This session will describe a study that investigated those abstractions' effects. Highlighted strategies will include modeling and using number lines and number bonds across the curriculum.

#### **Janice Grow-Maienza**

*Truman State University, Kirksville, Missouri*

#### **Daniel Kitashima**

*Ka Waihona o ka Na'auao Public Charter School, Waianae, Hawaii*

#### **K. Scott Alberts**

*Truman State University, Kirksville, Missouri*

2nd Floor Serpentine Lobby, Table 1

## 2

### **Collaborating to Develop FUSION, a First-Grade Mathematics Intervention**

#### Poster Session

FUSION, a first-grade intervention program for at-risk students, targets whole-number understanding with number sense, base ten and place value, and number operations. The speakers will present their curriculum development process, which uses teacher-researchers and FUSION's design features, observation systems, and early field-test data.

#### **Christian Doabler**

*Center on Teaching and Learning, University of Oregon, Eugene, Oregon*

#### **Mari Strand Cary**

*Center on Teaching and Learning, University of Oregon, Eugene, Oregon*

2nd Floor Serpentine Lobby, Table 2

For your safety and due to fire regulations, only those with seats will be allowed in meeting rooms. To comply with fire codes, it may be necessary to ask any person sitting on the floor or standing to leave the room.

Please remember:

- All meeting rooms will be cleared between presentations.
- All seats are available on a first-come, first-served basis.
- Reserving spaces in line or saving seats is not permitted.
- As a courtesy to the speaker and your colleagues, please turn off your cell phone during all presentations.

### 3

## Concreteness Fading in Supporting the Learning and Transfer of the Distributive Property

### Poster Session

This study explored concreteness fading used by a dominant Chinese elementary textbook series to support the learning and transfer of the distributive property. Findings revealed three main features—(1) being principled with multifaceted uses, (2) being progressive with visible connections, and (3) being purposeful with explicit supports.

**Meixia Ding**

*University of Nebraska—Lincoln, Lincoln, Nebraska*

**Xiaobao Li**

*University of Houston, Houston, Texas*

2nd Floor Serpentine Lobby, Table 3

### 4

## Content Analysis of the Bahamian National Examination in Middle-School Mathematics

### Poster Session

Since achieving independence from England in 1973, the Bahamian government has developed educational policy requiring all its citizens to take national examinations at the end of grades 9 and 12. This study qualitatively describes the ninth-grade examination's content for 2002–06 and 2008–09.

**Yolanda A. Rolle**

*Boston University, Boston, Massachusetts*

2nd Floor Serpentine Lobby, Table 4

### 5

## Creativity as Intercontextuality in Math Education

### Poster Session

Little room for imagination or creativity seems to exist in mathematics classrooms. However, describing creativity as seeing problems in new ways and adaptively escaping the bounds of conventional thinking fits the concept of intercontextuality, one method shown to increase transfer. The speaker will discuss two cases.

**Jacqueline L. Barnes**

*Indiana University Bloomington, Bloomington, Indiana*

2nd Floor Serpentine Lobby, Table 5



## 6

## Deer in the Headlights: Designing Professional Development for Math PBL

### Poster Session

This session will discuss (1) the professional development given to teachers prior to implementing project-based learning (PBL) and (2) its effects on teachers' content knowledge, practices, and attitudes toward PBL. The speakers will describe elements of a productive mathematical teaching disposition and its impact on the project's success.

#### **Rick A. Hudson**

*University of Southern Indiana, Evansville, Indiana*

#### **Dionne I. Cross**

*Indiana University Bloomington, Bloomington, Indiana*

#### **Catherine Brown**

*Indiana University Bloomington, Bloomington, Indiana*

2nd Floor Serpentine Lobby, Table 6

## 7

## Supporting Preservice Teachers in Designing Project-Based Learning Units

### Poster Session

The speakers will examine how preservice secondary school teachers design and implement project-based learning units, giving specific examples that demonstrate how a project's mathematical rigor can fluctuate during implementation and the related, influencing factors. They will suggest ways to improve novice teachers' confidence and expertise.

#### **Jean S. Lee**

*University of Indianapolis, Indianapolis, Indiana*

#### **Howard Fischer**

*University of Indianapolis, Indianapolis, Indiana*

#### **Katherine Castro**

*University of Indianapolis, Indianapolis, Indiana*

#### **Melvin Bridges**

*University of Indianapolis, Indianapolis, Indiana*

2nd Floor Serpentine Lobby, Table 7

## 8

### Enacting New Curriculum: A Teacher's First Attempt with Data Modeling

#### Poster Session

Curriculum design aims to develop strategies and tools that create opportunities for learning. Curriculum, however, does not interact with students in a sterile environment. This session will analyze a teacher's first attempt at using an innovative statistics curriculum and suggest additional features to support teachers during implementation.

**Ryan Seth Jones**

*Vanderbilt University, Nashville, Tennessee*

**Min-Joung Kim**

*Vanderbilt University, Nashville, Tennessee*

2nd Floor Serpentine Lobby, Table 8

## 9

### Examining Students' Engagement through the Lens of Imaginative Education

#### Poster Session

This session will present results from a qualitative study that investigated six students' perspectives of learning geometry, using the theory of imaginative education to examine students' engagement. Combining affective responses and imagination created stepping stones to increased engagement and to developing cognitive understanding.

**Pamela A. Hagen**

*University of British Columbia; School District 43, Coquitlam, Vancouver, Canada*

2nd Floor Serpentine Lobby, Table 9

## 10

### Expanding Models of Students' Combinatorial Reasoning

#### Poster Session

This presentation will report on data from an eight-month, constructivist teaching experiment with three eighth-grade students. It will extend a previously developed framework for studying students' two-dimensional, combinatorial reasoning by examining students' reasoning on arrangement and combination problems.

**Erik Tillema**

*Indiana University Purdue University Indianapolis, Indianapolis, Indiana*

2nd Floor Serpentine Lobby, Table 10

**11****Exploring How Accurately Grades K–3 Children Assess Their Mathematical Competencies****Poster Session**

The speakers will report findings from TEMA-3 and a Child Belief Survey that examine association strength between mathematics ability and high-versus-low math-competency beliefs among students in a midwestern state. Several differences were significant, with the differences greater in grades 2–3 than in grades K–1.

**Traci S. Kutaka**

*University of Nebraska—Lincoln, Lincoln, Nebraska*

**Wendy Smith**

*University of Nebraska—Lincoln, Lincoln, Nebraska*

**Carolyn Pope-Edwards**

*University of Nebraska—Lincoln, Lincoln, Nebraska*

2nd Floor Serpentine Lobby, Table 11

**12****Factors Influencing College Success in Mathematics (FICSMath) Project****Poster Session**

The FICSMath project focused on finding evidence for effective strategies that prepare students across the nation for college calculus. A model created from data on more than 3,000 secondary school students reveals significant, positive pedagogies that predict college calculus success.

**Carol Wade**

*Clemson University, Clemson, South Carolina*

**Charity Watson**

*Clemson University, Clemson, South Carolina*

**Jennifer Cribbs**

*Clemson University, Clemson, South Carolina*

2nd Floor Serpentine Lobby, Table 12

# 13

## How Does Professional Development in Professional Noticing Lead to High Mathematics Achievement?

### Poster Session

Why can some schools help their mathematics teachers adopt new practices to make their instruction more effective? This research study will examine how small professional learning communities affect teachers' professional noticing—teachers' conceptualizations and descriptions of, and responses to, their students' mathematical thinking.

**Marcia DeJesus-Rueff**

*Expeditionary Learning, New York, New York*

2nd Floor Serpentine Lobby, Table 13

# 14

## Instructional Provocations for Inquiry-Based Learning in College Mathematics

### Poster Session

The speakers will propose some forms of instructional provocations that may help college teachers encourage inquiry-based learning, focusing on contrasting prompts, potentially pivotal bridging examples, and stimulating questions. Their study's data, collected from a design experiment with two students, report that these discursive moves encouraged students to develop their reasoning and understanding.

**Kyeong Hah Roh**

*Arizona State University, Tempe, Arizona*

**Aviva Halani**

*Arizona State University, Tempe, Arizona*

2nd Floor Serpentine Lobby, Table 14

# 15

## Mathematics Course Taking in Rural High Schools

### Poster Session

This session will use 2005 NAEP High School Transcript Study data (number of mathematics credits earned, highest mathematics course taken, and enrollment and access to advanced or AP mathematics courses) to compare rural and nonrural high school students' mathematics course-taking patterns.

**Rick Anderson**

*Eastern Illinois University, Charleston, Illinois*

2nd Floor Serpentine Lobby, Table 15

**16****On Curricular Effectiveness: Professional Development (PD) Activities, Emphasis, and Impact****Poster Session**

This session will present findings related to PD of teachers participating in an NSF-funded, three-year, quasiexperimental longitudinal study. It will examine differences regarding the PD's duration, emphasis, and impact across teachers of different curriculum types and discuss why the PD did not correlate to students' higher achievement.

**R. Didem Taylan**

*University of Missouri—Columbia, Columbia, Missouri*

**James Tarr**

*University of Missouri—Columbia, Columbia, Missouri*

2nd Floor Serpentine Lobby, Table 16

**17****Preservice Elementary School Teachers' Conceptions of Mathematical Reasoning****Poster Session**

This session will report on a study of four preservice elementary school teachers, examining how their mathematical arguments—and their evaluations of others'—changed over the course of a semester in which public, collective mathematical reasoning was an integral feature.

**Michael H. Perkowski**

*University of Missouri—Columbia, Columbia, Missouri*

2nd Floor Serpentine Lobby, Table 17

**18****Preservice Mathematics Teachers' Attitudes in Instruction: Comparing the United States and China****Poster Session**

This session will compare the perspectives of 48 preservice teachers at Beijing Normal University, China, to those of 56 preservice teachers at Saint Cloud State University, Minnesota. The speaker will analyze quantitative results and follow-up interview data and discuss specific differences between the teacher preparation programs.

**Hsuehi (Martin) Lo**

*Saint Cloud State University, St. Cloud, Minnesota*

2nd Floor Serpentine Lobby, Table 18

# 19

## Prospective Teachers' Levels of Geometric Thinking through the Discursive Lens

### Poster Session

This study investigated the changes in prospective elementary school teachers' geometric discourse on classifying quadrilaterals, resulting from their participation in a university geometry course. The study produced a translation of van Hiele levels into a detailed model that describes students' levels of thinking discursively

**Sasha Wang**

*Michigan State University, East Lansing, Michigan*

2nd Floor Serpentine Lobby, Table 19

# 20

## Secondary School Students' Covariational Reasoning on Rate of Change

### Poster Session

This session will offer the results of an study examining secondary school students' reasoning in tasks with multiple representations of constant and varying rate of change. The speaker will discuss differences in sophistication of students' reasoning and implications for students' making sense of covarying quantities in rates of change.

**Heather Lynn Johnson**

*University of Colorado Denver, Denver, Colorado*

2nd Floor Serpentine Lobby, Table 20

# 21

## Textual Expression of Knowledge in Curricula: Illuminating Opportunities to Learn

### Poster Session

This presentation will discuss how textual analysis of written curriculum materials illuminates issues regarding students' opportunities to learn area measurement. Discussion will focus on how textual elements express mathematical knowledge in three elementary school curricula and their implications are for students' opportunities to learn.

**Lorraine Males**

*Michigan State University, East Lansing, Michigan*

**Funda Gonulates**

*Michigan State University, East Lansing, Michigan*

2nd Floor Serpentine Lobby, Table 21

## 22

### **The Mathematics Expanded Curriculum: Critical Thinking and Creativity**

#### Poster Session

Contemporary conceptions of schooling's purpose prioritize higher-order thinking skills, such as problem solving and critical thinking, as goals that transcend conventional mathematical facts and procedures. The speaker will report on Israeli research into instructional interventions designed to achieve this expanded curriculum.

**Einav Aizikovitsh-Udi**

*Harvard University Graduate School of Education, Cambridge, Massachusetts*

2nd Floor Serpentine Lobby, Table 22

## 23

### **The Relationships among Teachers' Mathematical Knowledge, Teaching, and Students' Learning**

#### Poster Session

Using data from 21 teachers, the speaker investigated relationships among teachers' mathematical knowledge, their teaching, and students' learning and how each one affects instruction and students' achievement.

**Yasemin Copur**

*University of Illinois at Urbana-Champaign, Urbana-Champaign, Illinois*

2nd Floor Serpentine Lobby, Table 23

## 24

### **Thinking about Definitions: What Students Say, and What Students Do**

#### Poster Session

Do your students struggle with mathematical definitions? The speakers will share their analysis of interview data focused on what students say and do as they work on statements about prime numbers. Their analysis has led to an emerging framework for thinking about students' understanding of mathematical definitions.

**Margaret T. Kinzel**

*Boise State University, Boise, Idaho*

**Laurie O. Cavey**

*Boise State University, Boise, Idaho*

2nd Floor Serpentine Lobby, Table 24

## 25

### **Turkish Student Teachers' Attitudes toward Mathematics and Science Integration**

#### **Poster Session**

This study investigated how student teachers' attitudes toward mathematics and science integration relate to their universities' teacher preparation curricula. The research showed university A, focusing on curriculum knowledge, produced students with a more negative attitude for mathematics and science integration than university B, focusing pedagogical content knowledge.

#### **Sencer Corlu**

*Texas A&M University, College Station, Texas*

#### **Robert M. Capraro**

*Texas A&M University, College Station, Texas*

#### **Mary Margaret Capraro**

*Texas A&M University, College Station, Texas*

2nd Floor Serpentine Lobby, Table 25

## 26

### **When Students with Resources Fail: How Beliefs Affect Problem Solving**

#### **Poster Session**

This poster session will report trends from a study that examined causes of urban students' challenges in solving nonroutine mathematics problems when formal resources were not lacking. Data reveals three categorical trends in students' beliefs paralleling three trends in students' effective use of control and subsequent problem-solving success.

#### **Sarah E. Nix**

*University of California at Berkeley, Berkeley, California*

2nd Floor Serpentine Lobby, Table 26



# 27

## Who Teaches Mathematics Content Courses for Preservice Elementary School Teachers?

### Poster Session

This poster session will present and discuss results of a nationwide survey of all higher education institutions on mathematics content courses for preservice elementary school teachers, what mathematics content these courses include, who teaches these courses, and on the instructors' academic and teaching backgrounds.

**Joanna O. Masingila**

*Syracuse University, Syracuse, New York*

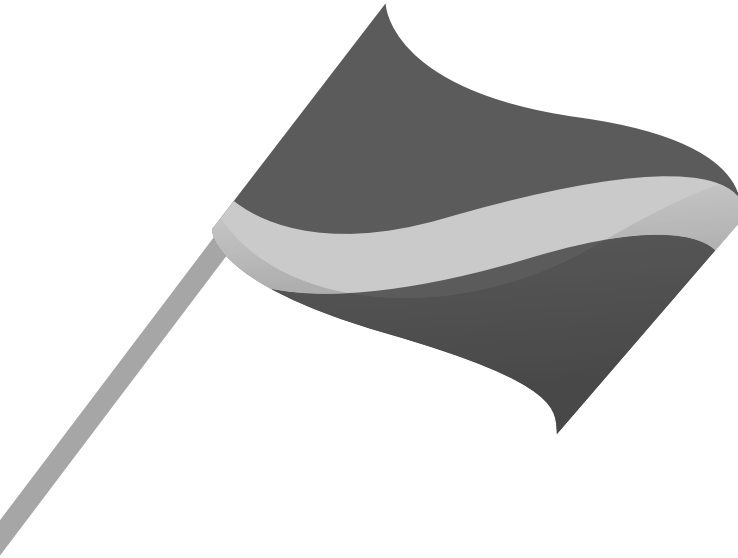
**Dana Olanoff**

*Syracuse University, Syracuse, New York*

**Dennis K. Kwaka**

*Syracuse University, Syracuse, New York*

2nd Floor Serpentine Lobby, Table 27



## Opening Session

### 28

## Maintaining Ambitious Teaching: Constraints, Affordances of Schools, Professional Education, Policy

This talk will report on research investigating what resources might make ambitious mathematics teaching the norm in U.S. schools, and what stands in the way. The speaker will examine intellectual, social, and material resources that could be common tools and language for a teaching practice, and illustrate the roles that these can play.

**Magdalene Lampert**

*University of Michigan, Ann Arbor, Michigan*

Sagamore 4, Capacity: 546



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**Tuesday, April 12th**

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**8:30 a.m.–10:00 a.m.**

**29**

## **Differentiating Instruction to Meet All Students' Needs: Bringing Research and Practice Together**

### **Research Symposium**

This session will describe collaborative work to develop mutual visions for teaching mathematics to English language learners and special-needs students. The speakers will also address tensions and opportunities inherent in providing equitable, optimal learning opportunities for all students.

#### **Jennifer M. Bay-Williams**

*University of Louisville, Louisville, Kentucky*

#### **Socorro Herrera**

*Kansas State University, Manhattan, Kansas*

#### **Barbara J. Dougherty**

*Iowa State University, Ames, Iowa*

#### **Anne Foegen**

*Iowa State University, Ames, Iowa*

#### **Discussant: Karen Karp**

*University of Louisville, Louisville, Kentucky*

#### **Discussant: Rochelle Gutierrez**

*University of Illinois at Urbana-Champaign, Champaign, Illinois*

201, Capacity: 84

# 30

## Knowledge and Characteristics of Teachers and Their Students' Achievement

### Research Symposium

This session will (1) present findings from a program of research addressing teachers' characteristics (background, knowledge, beliefs, and professional experiences) and students' achievement and (2) engage participants in a discussion of implications for teacher preparation, evaluation policies, and next steps.

**Patricia F. Campbell**

*University of Maryland, College Park, Maryland*

**Toni M. Smith**

*George Mason University, Fairfax, Virginia*

**Lawrence M. Clark**

*University of Maryland, College Park, Maryland*

**Amber Rust**

*University of Maryland, College Park, Maryland*

**Masako Nishio**

*University of Maryland, College Park, Maryland*

**Darcy Conant**

*University of Maryland, College Park, Maryland*

**Discussant: Robert Ronau**

*University of Louisville, Louisville, Kentucky*

**Discussant: Diane J. Briars**

*National Council of Supervisors of Mathematics, Pittsburgh, Pennsylvania*

202, Capacity: 87

**31****From Dissertation to Publication in Journal for Research in Mathematics Education (JRME)****Research Symposium**

Two researchers who recently turned their dissertations into accepted articles for *JRME* will share their experiences regarding how to restructure a dissertation into manuscript form. Participants will learn *JRME*'s submission and review process and the characteristics of a strong manuscript and then discuss topics in small groups.

**M. Kathleen Heid**

*Editor, Journal for Research in Mathematics Education; Pennsylvania State University, University Park, Pennsylvania*

**Michael Oehrtman**

*Arizona State University, Phoenix, Arizona*

**Kristen Bieda**

*Michigan State University, East Lansing, Michigan*

**Maria Blanton**

*Editorial Panel Chair, Journal for Research in Mathematics Education; University of Massachusetts, Dartmouth, Fairhaven, Massachusetts*

**Members of JRME Editorial Panel**

203, Capacity: 90

**32****Research in Grades K–8 Mathematics Instructional Coaching****Work Session**

Participants will consider results from a study investigating knowledge that contributes to successful mathematics instructional coaching. The session will focus on defining and assessing coaching knowledge. It will investigate methods used to create definitions of coaching knowledge and findings from an instrument that measures that knowledge.

**Elizabeth A. Burroughs**

*Montana State University, Bozeman, Montana*

**David Yopp**

*Montana State University, Bozeman, Montana*

**John T. Sutton**

*RMC Research Corporation, Denver, Colorado*

204, Capacity: 100

## 33

### Examining Learning Progressions, Trajectories, and Levels: Beyond Scope and Sequence

#### Research Symposium

Is a learning trajectory distinct from scope and sequence? How do progressions, trajectories, and levels differ? Are learning trajectories idiosyncratic by curricula? The speakers will define the construct and then compare two trajectory-based accounts on the same topic for coherence. What implications exist for theory, research, and practice?

**Jeffrey E. Barrett**

*Illinois State University, Normal, Illinois*

**Douglas Clements**

*University at Buffalo, State University of New York, Buffalo, New York*

**Michael T. Battista**

*Ohio State University, Columbus, Ohio*

**Julie Sarama**

*University at Buffalo, State University of New York, Buffalo, New York*

**Discussant: Jack Smith**

*Michigan State University, East Lansing, Michigan*

Sagamore 1, Capacity: 280

## 34

### Articulated Learning Trajectories: A Method for Examining the Textbook Curriculum

#### Work Session

The speaker will present findings comparing articulated learning trajectories in developing algebraic thinking constructs from pattern concepts in four middle grades textbook series. He will describe efforts to extend textbook examination to include different content and grade levels. He will discuss theoretical considerations and content.

**Travis Olson**

*University of Nevada, Las Vegas, Las Vegas, Nevada*

Sagamore 2, Capacity: 190

**35** Interactive Paper Session**Assessing Teachers' Mathematical Knowledge**

This study will investigate the relationship between two measures widely used to assess teachers' mathematics knowledge for teaching. It compares 25 teachers' scores on those measures and sought to identify which assessment could better detect gains teachers made during a mathematics content/pedagogy hybrid course and a mathematics course.

**Yasemin Copur**

*University of Illinois at Urbana-Champaign, Champaign, Illinois*

**Sarah Lubienski**

*University of Illinois at Urbana-Champaign, Champaign, Illinois*

**High School Teachers' Mathematical Knowledge for Teaching Discrete Mathematics**

A large professional development institute studied urban high school teachers' discrete mathematics learning. The professional development emphasized essential concepts of discrete mathematics by modeling scientific phenomena. Repeated analysis of variance measures showed significant learning and improved pedagogy over the course of the program.

**James A. Middleton**

*Arizona State University, Tempe, Arizona*

**Mona Toncheff**

*Phoenix Union High School District, Phoenix, Arizona*

**Investing in Teachers: A Metaanalysis on Professional Development's Focus**

This session will present the results of a metaanalysis intended to clarify the relationship between the substantive-content focus of in-service mathematics teachers' professional development and their students' achievement.

**Alejandra Salinas**

*Boston University, Boston, Massachusetts*

**Discussant: Catherine Brown**

*Indiana University Bloomington, Bloomington, Indiana*

Sagamore 3, Capacity: 210

# 36

## Improving Teachers or Teaching: Alternatives for Improving Classroom Instruction

### Research Symposium

Improving classroom instruction is usually addressed by recruiting or training better teachers. An alternative, not tried seriously in the United States, is improving teaching by building instructional products that all teachers can use and to which all teachers can contribute. The speakers will propose and critique this alternative.

**James Hiebert**

*University of Delaware, Newark, Delaware*

**Anne Morris**

*University of Delaware, Newark, Delaware*

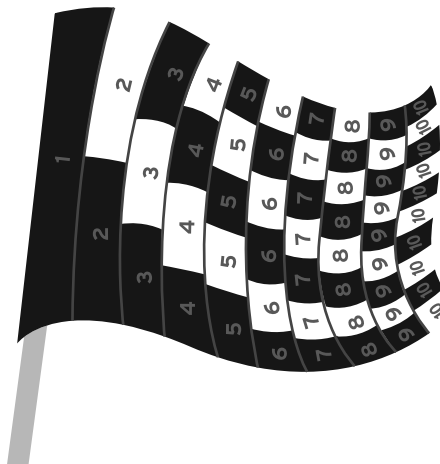
**Discussant: Deborah Loewenberg Ball**

*University of Michigan, Ann Arbor, Michigan*

**Discussant: Magdalene Lampert**

*University of Michigan, Ann Arbor, Michigan*

Sagamore 4, Capacity: 546





**37** Interactive Paper Session**Changing Teaching Practices and Students' Outcomes through Collaborative Evaluation**

Professional development that encourages teachers to reflect on mathematics instruction, observe classroom practices, and engage in investigating students' learning facilitates more effective instruction and improved outcomes. A longitudinal study will examine a collaborative evaluation's effects on an elementary school's instruction and outcomes.

**Kelli Thomas**

*University of Kansas, Lawrence, Kansas*

**Developing Teachers' Algebraic Connections and Representational Fluency**

The speakers will examine teachers' development of algebraic connections and representational fluency, describe a content-focused summer institute and a lesson study during the academic year, and identify experiences that catalyzed change in teachers' pedagogical strategies and dispositions toward teaching with problem solving.

**Jennifer M. Suh**

*George Mason University, Fairfax, Virginia*

**Spencer Jamieson**

*Fairfax County Public Schools, Fairfax, Virginia*

**Patricia Freeman**

*Fairfax County Public Schools, Fairfax, Virginia*

**Mathematics: Understanding, Learning, and Teaching (MULT)**

A longitudinal study combined cognitively guided instruction and Japanese lesson study models, analyzing changes among participants. Results include the program's impact on teachers' mathematics knowledge, beliefs about teaching and learning mathematics, and changes in instruction to support students' conceptual understanding of mathematics.

**Naomi S. Kent**

*San Joaquin Valley Mathematics Project; California State University, Fresno, Fresno, California*

**Melanie R. Wenrick**

*California State University, Fresno, Fresno, California*

**Rajee Amarsinghe**

*California State University, Fresno, Fresno, California*

**Discussant: June Mark**

*Education Development Center, Newton, Massachusetts*

Sagamore 5, Capacity: 210

## Observation of Learning Environments (OLE) in Mathematics Classrooms

This research session will focus on an instrument for the observing and assessing mathematics classroom instruction. OLE, developed as part of a Discovery K–12 NSF research grant, will enable the assessment of a mathematics learning environment in a classroom. The results of a validation study will also be discussed.

**Cathy J. Kinzer**

*New Mexico State University, Las Cruces, New Mexico*

**Lisa Virag**

*New Mexico State University, Las Cruces, New Mexico*

**Ken Korn**

*New Mexico State University, Las Cruces, New Mexico*

**Alfred Valdez**

*New Mexico State University, Las Cruces, New Mexico*

## Accessing Mathematical Understanding through the Hermeneutic Circle

This presentation will share a description of the research study designed to use the hermeneutic circle to access mathematical understanding. The speaker will pay particular attention to data collection and analysis methods. She will present a summary of results concerning prospective elementary school teachers' understanding of function.

**Valerie V. Sharon**

*Sam Houston State University, Huntsville, Texas*

## Collaborative, Metacognitive Interactions in Small-Group Mathematical Problem Solving

This session will describe a study examining problem-solvers' metacognitive activity in collaborative group interactions. It will chronicle social aspects of metacognitive activity in small-group problem solving and characterize situations associated with identified metacognitive activity. Participants will analyze transcripts.

**Marta T. Magiera**

*Marquette University, Milwaukee, Wisconsin*

Sagamore 6, Capacity: 150

*(Session continued)*

**38** Interactive Paper Session (continued)

## The M-Scan Measure of Mathematics Instructional Quality

This paper describes research using M-Scan, an observational assessment system for mathematics instruction quality. M-Scan measures cognitive depth, problem solving, connections and applications, explanation and justification, mathematical discourse, multiple representations, lesson structure, students' use of mathematical tools, and accuracy.

**Sara Rimm-Kaufman**

*University of Virginia, Charlottesville, Virginia*

**Erin Ottmar**

*University of Virginia, Charlottesville, Virginia*

**Eileen Merritt**

*University of Virginia, Charlottesville, Virginia*

**Discussant: Daniel Heck**

*Horizon Research, Inc., Chapel Hill, North Carolina*

Sagamore 6, Capacity: 150



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# 39

## Professional Development: Leading Mathematical Tasks versus Discussions of Classroom Practice

### Work Session

This working session will feature two leader-preparation, research-and- development projects that study what professional developers need to know and be able to do. Participants will explore two aspects of leaders' work: leading mathematical tasks with teachers and facilitating discussions of classroom practice.

#### **Elham Kazemi**

*University of Washington, Seattle, Washington*

#### **Cathy Carroll**

*West Ed, Redwood City, California*

#### **Megan Kelley-Petersen**

*University of Washington, Seattle, Washington*

#### **Hilda Borko**

*Stanford University, Stanford, California*

#### **Karen Koellner**

*Hunter College, City University of New York, New York*

#### **Jennifer Jacobs**

*University of Colorado at Boulder, Boulder, Colorado*

#### **Sarah Kate Selling**

*Stanford University, Stanford, California*

#### **Rebekah Elliott**

*Oregon State University, Corvallis, Colorado*

Sagamore 7, Capacity: 190

## 40

### Analyzing Teachers' Discussions about Representations of Teaching

#### Research Symposium

Using representations of mathematics teaching in videos, animations, and written cases is a ubiquitous practice in teacher education and in research. The session includes a collection of papers with different methodological approaches to examining teachers' discussions around representations of mathematics teaching.

**Gloriana González**

*University of Illinois at Urbana-Champaign, Urbana-Champaign, Illinois*

**Patricio G. Herbst**

*University of Michigan, Ann Arbor, Michigan*

**Hagit Sela**

*University of Maryland, College Park, Maryland*

**Kristen Bieda**

*Michigan State University, East Lansing, Michigan*

**Deborah Moore-Russo**

*University at Buffalo, State University of New York, Buffalo, New York*

**Janine M. Viglietti**

*University at Buffalo, State University of New York, Buffalo, New York*

**Discussant: Ellice Forman**

*University of Pittsburgh, Pittsburgh, Pennsylvania*

201, Capacity: 84

# 41

## Teachers' Knowledge Relevant to Using Standards-Based Curriculum Materials

### Research Symposium

This symposium will explore the relationships between teachers' knowledge and teachers' use of curriculum materials. The speakers will focus on how knowledge developed from using Standards-based materials, professional development workshops, and other district-provided resources, affects teachers' use of the materials.

#### **Jeffrey M. Choppin**

*University of Rochester, Rochester, New York*

#### **Corey Drake**

*Iowa State University, Ames, Iowa*

#### **Tonia J. Land**

*Iowa State University, Ames, Iowa*

#### **Discussant: Amy Roth McDuffie**

*Washington State University Tri-Cities, Richland, Washington*

202, Capacity: 87

# 42

## Writing a Successful Grant Proposal for NSF's Division for Research on Learning

### Research Symposium

This session will acquaint participants with current funding opportunities at NSF. The speakers will describe program priorities; the processes for development, submission, and review of proposals; and crucial considerations in preparing strong proposals.

#### **Jinfa Cai**

*National Science Foundation, Arlington, Virginia*

#### **Patricia Wilson**

*National Science Foundation, Arlington, Virginia*

203, Capacity: 90

## 43

### **Research on the Enacted Mathematics Curriculum: Report of a Conference**

#### **Work Session**

This working session will discuss and critique a conceptual framework and research agenda, related to research on the enacted mathematics curriculum, that were generated at a conference in November 2010.

#### **Denisse R. Thompson**

*University of South Florida, Tampa, Florida*

#### **Mary Ann Huntley**

*Cornell University, Ithaca, New York*

#### **Sharon L. Senk**

*Michigan State University, East Lansing, Michigan*

#### **Kathryn Chval**

*University of Missouri—Columbia, Columbia, Missouri*

#### **Steven Ziebarth**

*Western Michigan University, Kalamazoo, Michigan*

#### **Iris Weiss**

*Horizon Research, Chapel Hill, North Carolina*

204, Capacity: 100

# 44

## Assessing and Measuring Change in Reflective Practices of Preservice Teachers

### Research Symposium

The speakers will discuss the implementing an innovative approach to field experiences for elementary mathematics methods. They will share results from efforts to develop assessments for important aspects of reflective teaching and to identify indicators of change in the quality of preservice teachers' practices and predictors of teaching quality.

#### **Enrique Galindo**

*Indiana University Bloomington, Bloomington, Indiana*

#### **Anderson Norton**

*Virginia Polytechnic and State University, Blacksburg, Virginia*

#### **Kathryn Essex**

*Indiana University Purdue University Columbus, Columbus, Indiana*

#### **Rick A. Hudson**

*University of Southern Indiana, Evansville, Indiana*

#### **Julie Amador**

*Indiana University Bloomington, Bloomington, Indiana*

#### **Discussant: Barbara Reys**

*University of Missouri—Columbia, Columbia, Missouri*

Sagamore 1, Capacity: 280

# 45

## Supporting Secondary School Mathematics Teachers' Purposeful and Powerful Discourse

### Work Session

This symposium will share concepts and activities from professional development materials designed to help facilitators collaborate with secondary school teachers to develop purposeful, powerful classroom discourse. Participants will engage in, analyze, and discuss the activities, using the theories to consider work with mathematics teachers.

#### **Beth Herbel-Eisenmann**

*Michigan State University, East Lansing, Michigan*

#### **Michael Steele**

*Michigan State University, East Lansing, Michigan*

#### **Michelle Cirillo**

*University of Delaware, Newark, Delaware*

Sagamore 2, Capacity: 190



**46** Interactive Paper Session**Mathematics Teacher Self-Efficacy, Knowledge, and Mathematics Instructional Quality**

This study examines how mathematics teacher self-efficacy beliefs, in addition to mathematical knowledge for teaching contribute to mathematics instructional quality. In addition, this study investigates whether being trained in a social emotional learning intervention (the Responsive Classroom<sup>®</sup> (RC) approach) impacts teacher practices and the quality of mathematics instruction.

**Erin Ottmar**

*University of Virginia, Charlottesville, Virginia*

**Sara Rimm-Kaufman**

*University of Virginia, Charlottesville, Virginia*

**Temple Walkowiak**

*North Carolina State University, Raleigh, North Carolina*

**Body and Mind: About Which Aspects Do Primary School Teachers Care?**

Pursuing an interest in extralinguistic communication and collaborative learning, the speakers will analyze outcomes of a questionnaire administered to primary school teachers, investigating what they say they care about in teaching. Addressing teachers' beliefs, they will inquire to what extent teachers focus on embodied aspects of learning.

**Chiara Andrà**

*Dipartimento di Matematica, Università di Torino, Torino, Italy*

**Luciana Bazzini**

*Dipartimento di Matematica, Università di Torino, Torino, Italy*

**Integrated versus Discrete Perspectives on Equity in Mathematics Learning**

This paper explores preservice teachers' perspectives on relations among culture, power, and mathematics learning. Programs separating equity from inquiry tend to produce candidates who see the relations as discrete. Teachers with integrated perspectives often reject deficit viewpoints, noticing and intervening when unequal power hierarchies occur.

**Victoria Hand**

*University of Colorado at Boulder, Boulder, Colorado*

**Discussant: Randolph Philipp**

*San Diego State University, San Diego, California*

Sagamore 3, Capacity: 210

# 47

## Crucial, Culturally Relevant Mathematics Pedagogies and Curriculum in Urban Schools

### Research Symposium

This session will explore crucial mathematics and culturally relevant mathematics teaching and curriculum design, focusing on teachers' development, curriculum creation, and classroom enactment. The speakers will showcase four research and development projects, from three large cities, that are developing models for this work in urban classrooms.

#### **Janine Remillard**

*University of Pennsylvania, Philadelphia, Pennsylvania*

#### **Luke Reinke**

*University of Pennsylvania, Philadelphia, Pennsylvania*

#### **Nina D. Hoe**

*University of Pennsylvania, Philadelphia, Pennsylvania*

#### **Patricia Buenrostro**

*University of Illinois at Chicago, Chicago, Illinois*

#### **Eric (Rico) Gutstein**

*University of Illinois at Chicago, Chicago, Illinois*

#### **Laurie Rubel**

*Brooklyn College, Brooklyn, New York*

#### **Vivian Lim**

*University of Pennsylvania, Philadelphia, Pennsylvania*

#### **Andrew H. Chu**

*Graduate Center of the City University of New York, New York, New York*

Sagamore 4, Capacity: 546

**48** Interactive Paper Session**Developing an Equity Pedagogy for School Mathematics**

Preservice teachers' thinking about equity affects the instructional practices they will implement and teachers' education that prepares them to address inequities. This study examined preservice teachers' conceptions of equity, specifically how they addressed race. Implications for teacher education will be discussed.

**Delayne Y. Johnson**

*Clemson University, Clemson, South Carolina*

**Identifying and Defining Equitable Mathematics Instruction**

This study will probe what constitutes equitable mathematics instruction. Building on the Mathematical Knowledge for Teaching theory, the speaker will evaluate specific instructional practices, determine how particular teaching practices provide leverage, and create access to mathematics content for diverse learners.

**Imani Goffney**

*University of Houston, Houston, Texas*

**Understanding a Beginning Teacher's Sensitivity to Students and Mathematics**

The speakers will follow a beginning teacher to his classroom, to determine how his mathematics relates to that of his classroom. Jaworski's teaching triad and focus on mathematical processes illuminate how affective sensitivity to students without cognitive sensitivity increases student's engagement but offers only modest mathematical challenge.

**Rose Mary Zbiek**

*Pennsylvania State University—University Park, University Park, Pennsylvania*

**Tenille Cannon**

*Pennsylvania State University—University Park, University Park, Pennsylvania*

**Kim Johnson**

*Pennsylvania State University—University Park, University Park, Pennsylvania*

**Discussant: Carol E. Malloy**

*University of North Carolina at Chapel Hill; McGraw-Hill K–12 Mathematics, Chapel Hill, North Carolina*

Sagamore 5, Capacity: 210

## Analyzing Preservice Teachers' Pedagogical Content Knowledge of Fractions

The study assessed whether elementary school preservice teachers at a southwestern public university had appropriate profound knowledge of teaching fractions and could illustrate them with pictorial representations.

**Roslinda Rosli**

*Texas A&M University, College Station, Texas*

**Sunyoung Han**

*Texas A&M University, College Station, Texas*

**Mary Margaret Capraro**

*Texas A&M University, College Station, Texas*

## Bridging: Assimilation and Zone-of-Proximal-Development (ZPD)-Enhancing Practice in Chinese Pedagogy

Using a constructivist framework, the speakers will explain how Chinese pedagogical bridging (xian jie) practice promotes every student's assimilation of new ideas into available conceptions and thus empowers learning through one's ZPD. They will examine Year-7 teachers' views on bridging and examples of fractions leading to algebraic ideas.

**Xianyan Jin**

*Monash University, Victoria, Australia*

**Ron Tzur**

*University of Colorado Denver, Denver, Colorado*

## How Does Students' Fractional Knowledge Influence Equation Writing?

An interview study of 17 seventh and eighth graders determined relationships between their fraction knowledge and equation writing. Conceiving of improper fractions as numbers correlated writing multiplicative equations and facilitated reciprocal reasoning with unknowns. The speakers will explain the results.

**Amy J. Hackenberg**

*Indiana University Bloomington, Bloomington, Indiana*

**Mi Yeon Lee**

*Indiana University Bloomington, Bloomington, Indiana*

Sagamore 6, Capacity: 150

*(Session continued)*

**49** Interactive Paper Session (continued)**Understanding Perceptions Using Children's Thinking Activities**

Research shows that children's thinking activities help prospective teachers learn about children's mathematical thinking. Using these activities in a mathematics for teaching course suggests that prospective teachers with negative mathematics associations can experience mathematics in positive ways, allowing them to reevaluate their own thinking.

**Laura K. McLeman**

*University of Michigan—Flint, Flint, Michigan*

**Discussant: Kenny Nguyen**

*North Carolina State University, Raleigh, North Carolina*

Sagamore 6, Capacity: 150

**50**  
**Graduate Student, Junior Faculty, and Researcher Mentoring Session****Work Session**

Experienced faculty and researchers will provide mentoring on topics such as publishing dissertation-based manuscripts, finding faculty positions in higher education, transitioning from doctoral student to faculty member, grant writing, and navigating the tenure process. Attendees will rotate among topic-focused tables.

<b>Patricia Baltzley</b>	<i>Baltimore County Public Schools</i>
<b>David Barker</b>	<i>Illinois State University</i>
<b>Maria Blanton</b>	<i>University of Massachusetts-Dartmouth</i>
<b>Dana Cox</b>	<i>Miami University</i>
<b>Barbara Dougherty</b>	<i>Iowa State University</i>
<b>Randall E. Groth</b>	<i>Salisbury University</i>
<b>Karen Hollebrands</b>	<i>North Carolina State University</i>
<b>Karen King</b>	<i>New York University; NCTM</i>
<b>Eric Knuth</b>	<i>University of Wisconsin-Madison</i>
<b>Rebecca McGraw</b>	<i>University of Arizona</i>
<b>Jill Newton</b>	<i>Purdue University</i>
<b>Robert E. Reys</b>	<i>University of Missouri</i>
<b>Lynn Stallings</b>	<i>Kennesaw State University</i>
<b>James Tarr</b>	<i>University of Missouri</i>
<b>Dorothy Y. White</b>	<i>University of Georgia</i>
<b>Laura Van Zoest</b>	<i>Western Michigan University</i>

Sagamore 7, Capacity: 190

## 51

## Learning about Mathematical Justification and Its Role in the Classroom

### Research Symposium

Three studies carefully examine teachers' conceptions of mathematical justification and argumentation and how enhancing them influences the teachers' practice. The three studies also examine how these conceptions transform in practice, further affecting the development of teachers' conceptions of justification and their practice.

#### Karen Marrongelle

*Portland State University, Portland, Oregon*

#### Sean Larsen

*Portland State University, Portland, Oregon*

#### Eva Thanheiser

*Portland State University, Portland, Oregon*

#### Megan Staples

*University of Connecticut, Storrs, Connecticut*

#### Tutita Casa

*University of Connecticut, Storrs, Connecticut*

#### Melissa Gresalfi

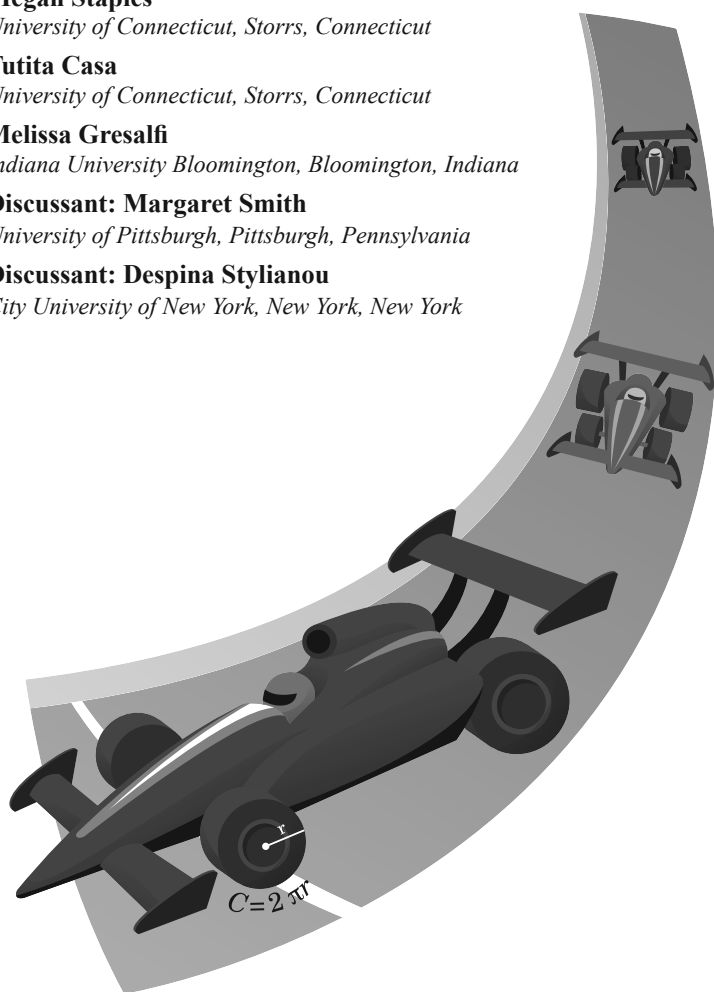
*Indiana University Bloomington, Bloomington, Indiana*

#### Discussant: Margaret Smith

*University of Pittsburgh, Pittsburgh, Pennsylvania*

#### Discussant: Despina Stylianou

*City University of New York, New York, New York*



201, Capacity: 84

**52****Examining Mathematics Curriculum Materials from the Perspective of Teachers' Use****Research Symposium**

This session will present analyses of five elementary school mathematics curricula concerning what teachers require to use them. The aim is to make visible the mathematical and pedagogical features teachers encounter when reading curriculum resources in order to guide research on teaching and curriculum materials and improved materials design.

**Ok-Kyeong Kim**

*Western Michigan University, Kalamazoo, Michigan*

**Napthalin A. Achubang**

*Western Michigan University, Kalamazoo, Michigan*

**Shari Ann Lewis**

*Aquinas College, Grand Rapids, Michigan*

**Nina D. Hoe**

*University of Pennsylvania, Philadelphia, Pennsylvania*

**Luke Reinke**

*University of Pennsylvania, Philadelphia, Pennsylvania*

**Janine Remillard**

*University of Pennsylvania, Philadelphia, Pennsylvania*

202, Capacity: 87

**53****Putting Policy into Practice: How Is Eighth-Grade Algebra Working?****Research Symposium**

Eighth-grade algebra is a heated topic among policymakers and educational practitioners, but little information exists on how it affects students. This session will discuss state and district studies of eighth-grade algebra and show how this practice has affected students' later mathematics course taking and achievement.

**Pamela Paek**

*Center for Assessment, Austin, Texas*

**Terry Vendlinski**

*National Center for Research on Evaluation, Standards, and Student Testing, Los Angeles, California*

**Steve Waterman**

*San Mateo County Office of Education, Daly City, California*

203, Capacity: 90

## 54

### Tapping and Mining Your Research for an Article for Teachers

#### Work Session

The Editorial Panels of the NCTM's teacher journals, *Teaching Children Mathematics*, *Mathematics Teaching in the Middle School*, and *Mathematics Teacher*, will offer writing tips and suggestions for potential and current authors. The session will focus on techniques for turning research articles into feature or department articles for the journals.

**Christine D. Thomas**

*Georgia State University, Atlanta, Georgia*

**Judith Zawojewski**

*Illinois Institute of Technology, Chicago, Illinois*

**Debra Johanning**

*University of Toledo, Toledo, Ohio*

**Robert Berry**

*University of Virginia, Charlottesville, Virginia*

**Laurie O. Cavey**

*Boise State University, Boise, Idaho*

**Margaret T. Kinzel**

*Boise State University, Boise, Idaho*

204, Capacity: 100

## 55

### International Comparisons in Mathematics Teacher Education: Research and Practice

#### Research Symposium

This session will describe challenges faced by cross-national comparative studies of mathematics teacher preparation, important findings from a recent study of 24,000 future primary and secondary schoolteachers in 17 countries, and implications for research and practice in teacher preparation.

**Sharon L. Senk**

*Michigan State University, East Lansing, Michigan*

**Maria Teresa Tatto**

*Michigan State University, East Lansing, Michigan*

**Discussant: Barbara Reys**

*University of Missouri—Columbia, Columbia, Missouri*

**Discussant: Jeremy Kilpatrick**

*University of Georgia, Athens, Georgia*

Sagamore 1, Capacity: 280



## 56

### Analyzing Video from an Urban “Math for Social Justice” Classroom

#### Work Session

Participants will view 15 minutes of video from a Mathematics for Social Justice class, taught by an experienced teacher in a public high school of all low-income students of color. After an overview, participants will analyze, critique, and discuss the video, first in small groups, then as a whole.

#### **Patricia Buenrostro**

*University of Illinois—Chicago, Chicago, Illinois*

#### **Anita Balasubramanian**

*University of Illinois—Chicago, Chicago, Illinois*

#### **Eric (Rico) Gutstein**

*University of Illinois at Chicago, Chicago, Illinois*

Sagamore 2, Capacity: 190



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## **An Instructional Intervention for Positively Affecting Students' Problem-Solving Beliefs**

This presentation will report findings from of a four-year design experiment in an undergraduate mathematics course. The findings show that achieving a notable positive effect is possible on four common and counterproductive beliefs students have about problem solving, with a 75-minute instructional intervention.

**Gabriel Stylianides**

*University of Oxford, Oxford, England*

**Andreas Stylianides**

*University of Cambridge, Cambridge, England*

## **Content Alignment between University Mathematics Placement Tests and High School Curriculum**

This study investigated the curricular validity of the university mathematics placement exam by analyzing content alignment between university placement exam and three high school mathematics curricula. The speaker will correlate results on content alignment with students' performance on the exam.

**Ke W. Norman**

*University of Montana, Missoula, Montana*

## **Investigating Teaching and Learning Infinite Series**

Instructors struggle to teach infinite series, and students have difficulty learning it. Several strategies used during the calculus reform movement were implemented during a unit on series. Students' responses gave insight into their misconceptions about the topic. Comparisons among classes documented the teaching strategies' effectiveness.

**Brian J. Lindaman**

*Montana State University, Bozeman, Montana*

**Discussant: Yvonne Lai**

*University of Michigan, Ann Arbor, Michigan*

Sagamore 3, Capacity: 210

## 58

### **Algebra: A Challenge at the Crossroads of Policy and Practice**

#### **Research Symposium**

Despite the urgent call for more students to complete algebra, research offers little clear information about the efficacy of universal and early algebra policies. This NSF-funded work addresses what is known and needs to be known about algebra policy in order to guide future policy and research.

#### **Mary Kay Stein**

*University of Pittsburgh, Pittsburgh, Pennsylvania*

#### **Milan Sherman**

*University of Pittsburgh, Pittsburgh, Pennsylvania*

#### **Julia Kaufman**

*University of Pittsburgh, Pittsburgh, Pennsylvania*

#### **Discussant: Bradford Findell**

*Ohio Department of Education, Columbus, Ohio*

#### **Discussant: Steven J. Leinwand**

*American Institutes for Research, Washington, District of Columbia*

#### **Discussant: William McCallum**

*University of Arizona, Tucson, Arizona*

Sagamore 4, Capacity: 546

## **Grades 4–6 Students’ Meanings for Informal and Formal Variable Representations**

This presentation reports on research on students’ meanings for variables across representations, tasks with equivalent mathematical structures, and task types. These students demonstrated similar and different meanings as those established by research as contributory to algebra students’ misconceptions and difficulties with variables

**J. Matt Switzer**

*University of Missouri—Columbia, Columbia, Missouri*

## **Representational Fluency of Rational Number Models in Third Grade**

A promising instructional approach to teaching rational number is a model grounded in embodied linear measure concepts. This research explores how, and in what circumstances, third-grade students transition between mental models of rational number. Results show that certain proficiencies allow easier access for some students than others.

**Erin Pfaff**

*Vanderbilt University, Nashville, Tennessee*

**Discussant: Jeffrey E. Barrett**

*Illinois State University, Normal, Illinois*

Sagamore 5, Capacity: 210

**60****Researching Preservice Teachers' Representations of Mathematics Teaching: Challenges and Possibilities****Work Session**

The presenters will share research contexts, methodologies, and insights from work with preservice teachers' representations of mathematics teaching. The audience will analyze and discuss sample representations using different frameworks. The session will then synthesize challenges, possibilities, and future directions for this line of research.

**Chia-Ling Chen**

*University of Michigan, Ann Arbor, Michigan*

**Sandra Crespo**

*Michigan State University, East Lansing, Michigan*

**Joy A. Oslund**

*Alma College, Alma, Michigan*

**Michael Weiss**

*Oakland University, Rochester, Michigan*

**Patricio G. Herbst**

*University of Michigan, Ann Arbor, Michigan*

Sagamore 6, Capacity: 150

**61****Taking Student-Centered Instruction Online****Work Session**

This working session will focus on the design of an online graduate program for middle school mathematics teachers. Committed to constructivist tenets, program developers will center discussions on challenges and some solutions to the paradox of teaching about student-centered, face-to-face mathematics instruction in a virtual environment.

**Shea Culpepper**

*University of Houston, Houston, Texas*

**Jennifer Chauvot**

*University of Houston, Houston, Texas*

**Whitney Grese Hannah**

*University of Houston, Houston, Texas*

**Anita Vyas**

*University of Houston, Houston, Texas*

Sagamore 7, Capacity: 190

**62****National Science Foundation (NSF) and Mathematics Education: Past, Present, and Future****Research Symposium**

This session will first present a historical analysis of NSF's role in mathematics education research and development. The speakers will then focus on how the mathematics education research community and NSF will work together to generate new knowledge.

**Jinfa Cai**

*National Science Foundation, Arlington, Virginia*

**John S. Bradley**

*National Science Foundation, Arlington, Virginia*

**Joan Ferrini-Mundy**

*National Science Foundation, Arlington, Virginia*

**Jeremy Kilpatrick**

*University of Georgia, Athens, Georgia*

**Glenda Lappan**

*Past President, NCTM; Michigan State University, East Lansing, Michigan*

**James A. Middleton**

*Arizona State University, Tempe, Arizona*

201, Capacity: 84

**63****Teachers' Professional Competence in Mathematics: Expert-Novice Comparison****Research Symposium**

Understanding teachers' professional competence (TPC) is the key to developing high-quality teachers. This session will describe three research studies, each focusing on a component of TPC by comparing Chinese novice and expert teachers. Participants will discuss each study and the implications for teachers' professional development.

**Rongjin Huang**

*University of Colorado Denver, Denver, Colorado*

**Yeping Li**

*Texas A&M University, College Station, Texas*

**Tingting Ma**

*Texas A&M University, College Station, Texas*

**Discussant: Anne Morris**

*University of Delaware, Newark, Delaware*

202, Capacity: 87

## 64

### **Launching Tasks and Equity in Opportunities to Learn: Research and Practice**

#### **Research Symposium**

This symposium will focus on launching cognitively demanding tasks in middle-grades mathematics. Presentations will describe theoretical considerations and empirical findings on the relationship among task launch methods, equity in learning opportunities, and the education design that teaches teachers to launch tasks equitably and accessibly.

#### **Melissa Boston**

*Duquesne University, Pittsburgh, Pennsylvania*

#### **Emily Shahan**

*Vanderbilt University, Nashville, Tennessee*

#### **Anne Garrison**

*Vanderbilt University, Nashville, Tennessee*

#### **Jonee Wilson**

*Vanderbilt University, Nashville, Tennessee*

#### **Lynsey Kay Gibbons**

*Vanderbilt University, Nashville, Tennessee*

#### **Kara Jackson**

*McGill University, Montreal, Quebec, Canada*

#### **Discussant: Megan Franke**

*University of California at Los Angeles, Los Angeles, California*

203, Capacity: 90

## 65

### Exploring and Heightening Teachers' Awareness of their Students' Mathematics Dispositions

#### Work Session

This working session will explore issues concerning designing, facilitating, and studying two cases of mathematics teaching focused on heightening teachers' awareness of their students' mathematics dispositions. Teachers will consider, among other items, the influence of race and class on their students' mathematics dispositions development.

#### **Lawrence M. Clark**

*University of Maryland, College Park, Maryland*

#### **Ann Ryu Edwards**

*University of Maryland, College Park, Maryland*

#### **Nancy Tseng**

*University of Maryland, College Park, Maryland*

#### **Toya Jones**

*University of Maryland, College Park, Maryland*

204, Capacity: 100

## 66

### Mathematics Teacher Noticing: Seeing through Teachers' Eyes

#### Research Symposium

This symposium examines the nature of mathematics teacher noticing, addressing some of the primal questions of teaching: Where do teachers look, what do they see, and what sense do they make of what they see? The presentations will draw from a recent book on mathematics teacher noticing comprising a diverse array of studies.

#### **Miriam Sherin**

*Northwestern University, Evanston, Illinois*

#### **Randolph Philipp**

*San Diego State University, San Diego, California*

Sagamore 1, Capacity: 280



## 67

### Mathematical Habits of Mind for Teaching

#### Work Session

This session will focus on using mathematicians' mathematical habits of mind as an organizing framework for mathematical knowledge for teaching in secondary school, engage in assessment items designed to measure mathematical habits of mind in teachers, and review and discuss video clips illustrating these approaches in practice.

#### **Ryota Matsuura**

*Saint Olaf College, Northfield, Minnesota*

#### **Sarah Sword**

*Center for Mathematics Education, Education Development Center, Newton, Massachusetts*

#### **Al Cuoco**

*Center for Mathematics Education, Education Development Center, Newton, Massachusetts*

#### **Glenn Stevens**

*Boston University, Boston, Massachusetts*

#### **Russell Faux**

*Davis Square Research Associates, Somerville, Massachusetts*

Sagamore 2, Capacity: 190



## Assessment Reform in Mathematics Classrooms: Practices and Dilemmas

This presentation will draw on two studies to consider the experiences of mathematics teachers in the context of calls from both assessment and mathematics education literature to shift assessment practices. It will offer robust descriptions of teachers' assessment to support students' learning, the dilemmas they face, and how they are supported.

**Christine Suurtamm**

*University of Ottawa, Ottawa, Canada*

## National Evaluation of Elementary School Math Curricula

This session will present results from a large-scale U.S. Department of Education study of the effectiveness of four elementary math curricula. The speakers will present results for first- and second-grade students and discuss whether instructional practices may account for any differences in curriculums' effects.

**Barbara Harris**

*Mathematica Policy Research, Washington, District of Columbia*

**Roberto Agodini**

*Mathematica Policy Research, Princeton, New Jersey*

## When the Experience Is Not Ideal: Implementing Integrated Mathematics Curriculum

After statewide implementation of an integrated mathematics curriculum, the speakers studied teachers' resulting conceptions of integrated mathematics. They will explore emergent themes in teachers' distinctions between experienced curriculum and ideally integrated mathematics curriculum and corresponding implications for future curriculum reform.

**Laura Marie Singletary**

*University of Georgia, Athens, Georgia*

**Zandra de Araujo**

*University of Georgia, Athens, Georgia*

**Patricia Wilson**

*National Science Foundation, Arlington, Virginia*

**Discussant: James Tarr**

*University of Missouri—Columbia, Columbia, Missouri*

Sagamore 3, Capacity: 210

## 69

# Who Decides What Counts as Mathematics Education?

### Research Symposium

Members of the editorial panel and authors whose work is featured in the special *Journal for Research in Mathematics Education* issue on equity will present their perspectives on the power dynamics that arise in defining mathematics education as a field.

#### **Rochelle Gutierrez**

*University of Illinois at Urbana-Champaign, Champaign, Illinois*

#### **Danny B. Martin**

*University of Illinois at Chicago, Chicago, Illinois*

#### **David Wayne Stinson**

*Georgia State University, Atlanta, Georgia*

#### **Beatriz D'Ambrosio**

*Miami University, Oxford, Ohio*

#### **Signe Kastberg**

*Purdue University, West Lafayette, Indiana*

Sagamore 4, Capacity: 546

## Helping At-Risk Kindergartners Develop Number Sense

An eight-week, targeted number sense intervention boosted high-risk kindergartners' number sense relative to that of their peers in a control group. The intervention was based on the premises that weaknesses in essential competencies underlie mathematics difficulties and that explicit instruction can develop these competencies early.

**Nancy Dyson**

*University of Delaware, Newark, Delaware*

**Nancy C. Jordan**

*University of Delaware, Newark, Delaware*

## Prekindergarten Early Algebra through Measurement and Quantitative Reasoning

This paper addresses an innovative approach to Pre-K students' development of quantitative and algebraic reasoning through measurement. The study adapts and refocuses the measurement-based algebraic design of the successful Elkonin-Davydov elementary school mathematics curriculum from Russia for use in teaching experiments with U.S. Pre-K students.

**Zaur Berkaliyev**

*Illinois Institute of Technology, Chicago, Illinois*

**Barbara J. Dougherty**

*Iowa State University, Ames, Iowa*

## The Magnitude Learning Trajectory of Struggling First-Grade Students

This session will compare the learning trajectory in magnitude for first-grade students demonstrating typical development with that of students struggling with mathematics. It will share the cognitive obstacles that struggling students encountered.

**John Lannin**

*University of Missouri—Columbia, Columbia, Missouri*

**J. Matt Switzer**

*University of Missouri—Columbia, Columbia, Missouri*

**Delinda van Garderen**

*University of Missouri—Columbia, Columbia, Missouri*

**Discussant: Diana V. Lambdin**

*Indiana University Bloomington, Bloomington, Indiana*

Sagamore 5, Capacity: 210

## 71

### Using Discourse to Develop Prospective Teachers' Mathematical Justifications

#### Work Session

This session will focus on discourse's role in advancing preservice elementary school teachers' knowledge of mathematics for teaching. Explore how using discourse in small-group and whole-class discussions can help preservice teachers represent, generalize, and justify mathematical ideas.

#### **Matthew Chedister**

*Boston University, Boston, Massachusetts*

#### **Suzanne H. Chapin**

*Boston University, Boston, Massachusetts*

#### **Ziv Feldman**

*Boston University, Boston, Massachusetts*

#### **Johanna Bunn**

*Boston University, Boston, Massachusetts*

#### **Diana Cheng**

*Middle Tennessee State University, Murfreesboro, Tennessee*

Sagamore 6, Capacity: 150

## 72

### Examining Content Knowledge for Teaching by Comparing Assessment Items

#### Work Session

The speakers will discuss improving the capacity to produce high-quality measures of content knowledge for teaching by working backwards, examining similarities and differences among items to produce language for and write features of items that express content knowledge for teaching.

#### **Erik D. Jacobson**

*University of Georgia, Athens, Georgia*

#### **Mark Thames**

*University of Michigan, Ann Arbor, Michigan*

#### **Deborah Loewenberg Ball**

*University of Michigan, Ann Arbor, Michigan*

#### **Yvonne Lai**

*University of Michigan, Ann Arbor, Michigan*

Sagamore 7, Capacity: 190

**73****A Study of Stages in Teachers' Leadership Development (TLD)****Poster Session**

The speakers will present a study of 31 certified mathematics teachers' TLD as they begin a leadership training program. Statistical analyses show differences in practices between high-, medium-, and limited-stage teachers across defined types of leadership activities along, with an emerging TLD pattern.

**Serigne Mbaye Gningue**

*City University of New York—Lehman College, New York City, New York*

**Roger Peach**

*City University of New York—Lehman College, New York City, New York*

2nd Floor Serpentine Lobby, Table 1

**74****Approaches to Developing Function Sense in Three Middle School Curricula****Poster Session**

This poster session will make a detailed comparison of approaches a Standards-based curriculum (Connected Mathematics Project) and two traditional middle school mathematics curricula (Glencoe, Saxon) take to developing function sense. The speakers will present 10 features of each curriculum's treatment of functions.

**John Moyer**

*Marquette University, Milwaukee, Wisconsin*

**Bikai Nie**

*University of Delaware, Newark, Delaware*

**Jinfa Cai**

*National Science Foundation, Arlington, Virginia*

2nd Floor Serpentine Lobby, Table 2

**75****Assessment for Learning and Formative Assessment:  
Establishing a Universal Definition****Poster Session**

Lack of common language when doing research in assessment for learning and formative assessment can cause confusion among researchers and educators. This session reports on an extensive literature review conducted to synthesize important concepts of both terms to establish a universal definition.

**Jonathan A. Engelman**

*Western Michigan University, Kalamazoo, Michigan*

**Lindsay A. Noakes**

*Western Michigan University, Kalamazoo, Michigan*

**Diane R. Rogers**

*Western Michigan University, Kalamazoo, Michigan*

2nd Floor Serpentine Lobby, Table 3

**76****College Professors' and Secondary School Teachers'  
Views on Preparation for College Calculus****Poster Session**

This presentation will offer two perspectives on preparing students for college calculus. College professors tell what secondary school teachers need to do to prepare students for success, and secondary school teachers tell what they do that they think makes a positive difference in their students' preparation.

**Carol Wade**

*Clemson University, Clemson, South Carolina*

**Charity Watson**

*Clemson University, Clemson, South Carolina*

**Jennifer Cribbs**

*Clemson University, Clemson, South Carolina*

2nd Floor Serpentine Lobby, Table 4

# 77

## Conceptions of Reform-Based Mathematics Teaching among Conference Presenters

### Poster Session

A phenomenographic approach investigated variations in conceptions of reform-based mathematics among presenters at a state conference. The study used the presenters' conceptions, mode of delivering the presentation, and intended impact on the audience to determine how the presentation aligned with mathematics education reform literature.

**Kimberly Gardner**

*Kennesaw State University, Kennesaw, Georgia*

**Kelly W. Edenfield**

*Kennesaw State University, Kennesaw, Georgia*

2nd Floor Serpentine Lobby, Table 5

# 78

## Defining Knowledge for Grades K–8 Mathematics Instructional Coaching

### Poster Session

This poster session will present results from a research study investigating knowledge that contributes to successful mathematics instructional coaching. The speakers will focus on defining and assessing coaching knowledge, highlighting study's methods and its measurement instrument.

**Elizabeth A. Burroughs**

*Montana State University, Bozeman, Montana*

**David Yopp**

*Montana State University, Bozeman, Montana*

**John T. Sutton**

*RMC Research Corporation, Denver, Colorado*

2nd Floor Serpentine Lobby, Table 6



**79****Developing of a Self-Efficacy Instrument for Algebra Teachers****Poster Session**

To address the need for an effective method to assess teacher confidence in reaching all students in algebra, a team of mathematics educators is currently working on the development of an instrument to measure teachers' self-efficacy in teaching algebra. In this session, participants will engage in the evaluation of instrument items.

**Trena Wilkerson**

*Baylor University, Waco, Texas*

**William A. Jasper**

*Sam Houston State University, Huntsville, Texas*

**Judy Taylor**

*LeTourneau University, Longview, Texas*

**Winifred Mallam**

*Texas Woman's University, Denton, Texas*

**Sarah E. Quebec Fuentes**

*Texas Christian University, Fort Worth, Texas*

**Colleen M. Eddy**

*University of North Texas, Denton, Texas*

**Sandi Cooper**

*Baylor University, Waco, Texas*

2nd Floor Serpentine Lobby, Table 7

**80****Functions Perspectives in Algebra: A Framework for Assessing Students' Knowledge****Poster Session**

This study analyzes grade 8–9 students' interviews in order to create an empirical basis for a framework for understanding mathematical functions in beginning algebra. The speakers will offer hypotheses about students' behavior in problem solving that may help identify a particular conception of mathematical function.

**Milan Sherman**

*University of Pittsburgh, Pittsburgh, Pennsylvania*

**Candace Walkington**

*University of Wisconsin—Madison, Madison, Wisconsin*

2nd Floor Serpentine Lobby, Table 8

# 81

## How Students of Diverse Abilities Use Diagrams to Solve Problems

### Poster Session

This session will present results from a study that examined how students of diverse abilities used diagrams to solve mathematics word problems, identify difficulties students encountered when using diagrams to solve the problems, and discuss implications for instruction.

#### **Delinda van Garderen**

*University of Missouri—Columbia, Columbia, Missouri*

#### **Amy Scheuermann**

*Minnesota State University, Mankato, Mankato, Canada*

#### **Christa Jackson**

*University of Kentucky, Lexington, Kentucky*

2nd Floor Serpentine Lobby, Table 9

# 82

## Integrating Reasoning and Proof in Secondary School Mathematics Classrooms

### Poster Session

Practicing secondary school teachers took a six-week, summer course on reasoning and proof. The course's curriculum aimed to develop the teachers' understanding and ability to reason and prove, as well as prepare them to promote similar understandings in their students. The speaker will share preliminary data on the teachers' learning.

#### **Justin D. Boyle**

*University of Pittsburgh, Pittsburgh, Pennsylvania*

2nd Floor Serpentine Lobby, Table 10

# 83

## Mapping Discourse and Interventions for Proof Tasks

### Poster Session

Research indicates that novel tasks, studying discourse, and relating students' work to a framework can help students develop reasoning and proving skills. Directed graphs and interactivity flowcharts reveal the effectiveness of teachers' interventions in moving students from nonproof arguments to proofs.

#### **Michelle S. Switala**

*Pine-Richland School District, Gibsonia, Pennsylvania*

2nd Floor Serpentine Lobby, Table 11

## 84

### **Mathematics Reform and English Language Learners: Challenges and Interventions**

#### **Poster Session**

This study conducted interviews to examine teachers' experiences implementing a reform-oriented mathematics curriculum with English language learners. Teachers discussed both the challenges encountered implementing the curriculum and the instructional interventions used to overcome them. The speaker will share implications for future research.

**Zandra de Araujo**

*University of Georgia, Athens, Georgia*

2nd Floor Serpentine Lobby, Table 12

## 85

### **Model-Centered Learning's Impact on Teachers' Attitudes toward Mathematics Teaching**

#### **Poster Session**

A professional development course for in-service teachers implemented mathematical modeling using dynamic learning technology. Participants took an online course on problem solving. Data collected from precourse and postcourse surveys showed significant improvement in teachers' confidence and attitudes toward doing and teaching mathematics.

**Linguo Bu**

*Southern Illinois University Carbondale, Carbondale, Illinois*

**Frackson Mumba**

*Southern Illinois University Carbondale, Carbondale, Illinois*

**Mary Wright**

*Southern Illinois University Carbondale, Carbondale, Illinois*

2nd Floor Serpentine Lobby, Table 13

## 86

### **Ordinary Teacher: A Case Study of a Middle-School Mathematics Teacher**

#### Poster Session

Compared to studies in other genres of mathematics education research, a disproportionately small number exists that describe the mathematics teacher and her students. To complement existing literature on mathematics teaching, this session will tell the story of one middle school mathematics teacher.

**Yolanda A. Rolle**

*Boston University, Boston, Massachusetts*

2nd Floor Serpentine Lobby, Table 14

## 87

### **Preservice Elementary School Teachers' Perceptions of Teaching Mathematics through Problem-Solving**

#### Poster Session

The speakers will present research findings on beginning preservice teachers' perceptions of a problem-solving approach to teaching and learning mathematics. Presentations will focus on preservice teachers experiences prior to joining the teacher education program that lead to those perceptions.

**Dennis K. Kwaka**

*Syracuse University, Syracuse, New York*

**Joanna O. Masingila**

*Syracuse University, Syracuse, New York*

2nd Floor Serpentine Lobby, Table 15

## 88

### **Preservice Teachers Understanding English Language Learners (ELLs) through Task-Based Interviews**

#### Poster Session

This talk will outline a study that engaged preservice, middle school mathematics teachers in task-based interviews with ELL students. The speaker will touch on preservice teachers' learning in the interview process and discuss developing best practices for training all mathematics teachers to work with ELL students.

**Anthony Fernandes**

*University of North Carolina at Charlotte, Charlotte, North Carolina*

2nd Floor Serpentine Lobby, Table 16

**89****Preservice Teachers' Place-Value Knowledge in and out of Base Ten****Poster Session**

The speaker will present preliminary results of a study that examined preservice teachers' understandings of place value and how that understanding connects across several contexts. He will contrast students' thinking in base ten, in alternative bases, and in the context of arithmetic algorithms.

**Peter S. Wiles**

*Eastern Illinois University, Charleston, Illinois*

2nd Floor Serpentine Lobby, Table 17

**90****Professional Learning: Grades K–3 Teachers as Staff Developers****Poster Session**

Five elementary school teachers had access to research-based pedagogy. As they conducted staff development sessions for colleagues, on what did they focus and why? The speakers analyzed levels of intellectual development, videotapes of teaching practice in their own classrooms, instructional practice during their staff development sessions, and responses from interviews on teaching and learning.

**Cheryl A. Lubinski**

*Illinois State University, Normal, Illinois*

**Jo Ann Cady**

*University of Tennessee, Knoxville, Tennessee*

**Patricia A. Guinee**

*Peoria School District, Peoria, Illinois*

2nd Floor Serpentine Lobby, Table 18

# 91

## Promoting Functional Thinking with Geometric Growing Patterns

### Poster Session

A study used design research to develop an instruction theory on students' development of functional thinking about geometric growing patterns. Four sixth-grade classrooms implemented pattern tasks that the theory helped create. The speaker will present findings about students' functional thinking development and effective ways to support learning.

**Kimberly Markworth**

*Western Washington University, Bellingham, Washington*

2nd Floor Serpentine Lobby, Table 19

# 92

## Sensitivity, Stability, Reliability: Testing the Teacher Attitude Variable on Early Mathematics

### Poster Session

This study explores the sensitivity, stability, and reliability of a survey instrument that measures teachers' attitudes and beliefs toward early mathematics learning and teaching. The speakers will describe the need for such study, the variable's development, the testing procedures and results, and the work's implications.

**Yinna Zhang**

*Erikson Institute, Chicago, Illinois*

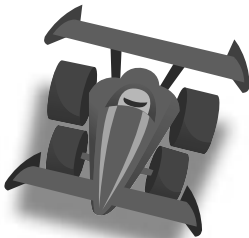
**Nikolaus Bezruczko**

*Measurement and Evaluation Consulting, Chicago, Illinois*

**Jie-Qi Chen**

*Erikson Institute, Chicago, Illinois*

2nd Floor Serpentine Lobby, Table 20



**93****Strategies and Invalid Reasoning Entailed in Examples for Comparing Fractions****Poster Session**

This session will examine examples for comparing fractions with unlike numerators and denominators in Everyday Mathematics and HarCourt Math. The speakers will present findings about possible strategies and noted invalid reasoning and discuss some considerations for selecting and choosing examples in written, enacted, and assessed curriculum.

**Dicky Ng**

*Utah State University, Logan, Utah*

**Minsung Kwon**

*University of Michigan, Ann Arbor, Michigan*

2nd Floor Serpentine Lobby, Table 21

**94****Students' Conceptions, Teachers' Actions: Exploring How Teachers Anticipate Students' Work****Poster Session**

This study analyzed data from study group discussions among high school geometry teachers. The paper will report on how teachers anticipated the different operations students could use to solve a problem about tangents. It will consider different combinations of operations in light of different conceptions of tangency students exhibit in their responses.

**Justin Dimmel**

*University of Michigan, Ann Arbor, Michigan*

2nd Floor Serpentine Lobby, Table 22

## 95

### **Success in the College Prep Mathematics: Policies' Impact**

#### **Poster Session**

This paper will examine the impact of policies employed by the Early College High School, Redesign, and High Schools That Work reform models on students' progression through the college prep mathematics pipeline. The examined policies include course-taking requirements, rigorous instruction, academic support, personalization, and relevance.

#### **Nina Arshavsky**

*SERVE Center, University of North Carolina at Greensboro, Greensboro, North Carolina*

#### **Luke Miller**

*The Urban Institute, Washington, District of Columbia*

#### **Julie Edmunds**

*SERVE Center, University of North Carolina at Greensboro, Greensboro, North Carolina*

2nd Floor Serpentine Lobby, Table 23

## 96

### **Teachers' Understanding of Culture Bias in Mathematics Problems**

#### **Poster Session**

This study introduces a hybrid multivocal analysis of six teachers' cultural scripts as they grappled with what they considered as culturally biased mathematics word problems. The approach portrays mathematics teachers' cultural constructions influencing their work with culturally and linguistically diverse students when teaching problem solving.

#### **Jane Wilburne**

*Pennsylvania State Harrisburg, Middletown, Pennsylvania*

#### **Martha Strickland**

*Pennsylvania State Harrisburg, Middletown, Pennsylvania*

#### **Barbara Marinak**

*Pennsylvania State Harrisburg, Middletown, Pennsylvania*

2nd Floor Serpentine Lobby, Table 24



## 97

## The Instructional Environment's Influence on Students' Part-Whole Understanding

### Poster Session

The classroom environment has a significant impact on students' interpretations of critical mathematical concepts. In dissertation research the speaker examined students' perceptions of part-whole relationships and how various classroom factors, particularly how teachers use multiple representational forms, constrain or support students' interpretations.

**Kelley Buchheister**

*University of Missouri—Columbia, Columbia, Missouri*

2nd Floor Serpentine Lobby, Table 25

## 98

## The Role of Similarity and Typicality in Students' Inferential Reasoning

### Poster Session

This poster session will display results from a study series designed to investigate middle school students' selection and use of examples for reasoning inferentially in mathematical contexts. The studies also contrast students' inferential reasoning in mathematical contexts with that in nonmathematical contexts.

**Eric Knuth**

*University of Wisconsin—Madison, Madison, Wisconsin*

**Amy Ellis**

*University of Wisconsin—Madison, Madison, Wisconsin*

**Caroline Williams**

*University of Wisconsin—Madison, Madison, Wisconsin*

2nd Floor Serpentine Lobby, Table 26

**99**

## **Trajectories of Teachers' Learning: Evolving Conceptions of High-Quality Mathematics Instruction**

Poster Session

This poster will model teachers' learning about concepts of high-quality mathematics instruction. The study was part of an examination of the impact of aspects of institutional settings on district-wide efforts to improve mathematics teaching and learning opportunities. The models offer a method for indexing teachers' related learning.

**Charles Munter**

*University of Pittsburgh, Pittsburgh, Pennsylvania*

2nd Floor Serpentine Lobby, Table 27

**100**

## **Transitioning to Principled Knowledge: A Teachers' Beliefs and Views**

Poster Session

The presentation will feature a unique professional learning opportunity, in which an elementary school teacher observed instruction for one academic year that focused on developing principled knowledge of mathematics. The speakers will describe the needed supports the teacher identified for transitioning into a mathematics teacher's role.

**Angela T. Barlow**

*University of Mississippi, University, Mississippi*

**Shannon Harmon**

*University of Mississippi, University, Mississippi*

2nd Floor Serpentine Lobby, Table 28

**101**

## **Wrestling with Math: From a Practice-Based Methods Course to Classrooms**

Poster Session

This study of eight teachers examined the connection between practice-based preservice teacher education and classroom practice. It found a relationship between how preservice school teachers are pressed to wrestle with content in a mathematics methods course and how they engage students around mathematical content as first-year teachers.

**Angela Chan Turrou**

*University of California at Los Angeles, Los Angeles, California*

2nd Floor Serpentine Lobby, Table 29

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**Wednesday, April 13th**

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**8:30 a.m.–10:00 a.m.**

## Plenary Session

# 102

## **Toward an Empirically Grounded Theory of Action for Improving Mathematics Teaching Quality at Scale**

This presentation will summarize current research findings capable of guiding large-scale mathematics instruction improvement and identify pressing, unresolved questions. The speakers will consider curriculum materials and frameworks, pull-out and job-embedded professional development, networks, coaching, and schools' and districts' leadership.

**Paul Anthony Cobb**

*Vanderbilt University, Nashville, Tennessee*

**Kara Jackson**

*McGill University, Montreal, Canada*

Sagamore 4, Capacity: 546



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# 103

## Using Argumentation in Analyzing Geometry Teaching and Learning

### Research Symposium

This session will bring together three projects, all involving teaching geometry to secondary school students, that analyzed collective argumentation to answer different questions, giving evidence argumentation's usefulness in addressing different kinds of research questions.

**AnnaMarie Conner**

*University of Georgia, Athens, Georgia*

**Patty Anne Wagner**

*University of Georgia, Athens, Georgia*

**Laura Marie Singletary**

*University of Georgia, Athens, Georgia*

**Brian W. Gleason**

*University of Georgia, Athens, Georgia*

**Kelly W. Edenfield**

*Kennesaw State University, Kennesaw, Georgia*

**Ryan Smith**

*University of Georgia, Athens, Georgia*

**Discussant: Karen F. Hollebrands**

*North Carolina State University, Raleigh, North Carolina*

201, Capacity: 84

**104****Studying Higher-Order Thinking during State Curriculum Reform Implementation****Research Symposium**

This symposium presents three research studies within a statewide, integrated, process standards-based mathematics curriculum implementation. Each study focused how teachers attended to higher-order thinking during implementation and the challenges encountered during the first years of standards reform.

**Kelly W. Edenfield**

*Kennesaw State University, Kennesaw, Georgia*

**Kyle T. Schultz**

*James Madison University, Harrisonburg, Virginia*

**Eileen Murray**

*University of Georgia, Athens, Georgia*

**Discussant: Jeremy Kilpatrick**

*University of Georgia, Athens, Georgia*

202, Capacity: 87

**105****Research in Statistics Education: Current Efforts and Future Directions****Research Symposium**

This session will explore recent research on developing teachers' and other adult learners' statistical knowledge and reasoning. The speakers will discuss to existing statistical education theory, the design of productive learning environments, and the use of assessment instruments to guide statistics education research.

**Randall E. Groth**

*Salisbury University, Salisbury, Maryland*

**Tim Jacobbe**

*University of Florida, Gainesville, Florida*

**Sandra Madden**

*University of Massachusetts Amherst, Amherst, Michigan*

**Andrew Zieffler**

*University of Minnesota, Minneapolis, Minnesota*

**Discussant: Rich Lehrer**

*Vanderbilt University, Nashville, Tennessee*

**Discussant: Hollylynne Lee**

*North Carolina State University, Raleigh, North Carolina*

203, Capacity: 90

# 106

## **Perspectives on Formative Assessment: Approaches in General and Special Education**

### **Work Session**

The speaker will describe secondary school applications of formative assessment; present divergent perspectives from general and special education, including research on assessments to monitor progress in algebra; and discuss strengths and limitations in conceptual frameworks, research methodology and results, and implications for instruction.

**Anne Foegen**

*Iowa State University, Ames, Iowa*

204, Capacity: 100

# 107

## **Studying Effective Mathematics Instruction: Assessment Systems, Professional Learning, Interventions**

### **Research Symposium**

This symposium will comparatively analyze four different studies that identify high-quality teaching practices in mathematics: two use assessment systems to identify high-quality instruction, one examines what mentor teachers convey about high-quality instruction to novice teachers, and one analyzes an expert teachers' teaching in a lab setting.

**Jennifer M. Lewis**

*Wayne State University, Detroit, Michigan*

**Deborah Loewenberg Ball**

*University of Michigan, Ann Arbor, Michigan*

**Douglas Corey**

*Brigham Young University, Provo, Utah*

**Jack A. Dieckmann**

*Stanford University, Stanford, California*

**Discussant: Kristin L. Umland**

*University of New Mexico, Albuquerque, New Mexico*

Sagamore 1, Capacity: 280

**108****Using Cell Phones for Social Mediated Mathematics Diagnostic Assessment****Work Session**

The speakers will present a diagnostic assessment system for equipartitioning using cell phones that addresses three challenges: opportunity to learn, self-directed learning, and students' growth documentation. They will describe the system along with research results. Participants will then use the instrument and discuss the system's validity.

**Kenny Nguyen**

*North Carolina State University, Raleigh, North Carolina*

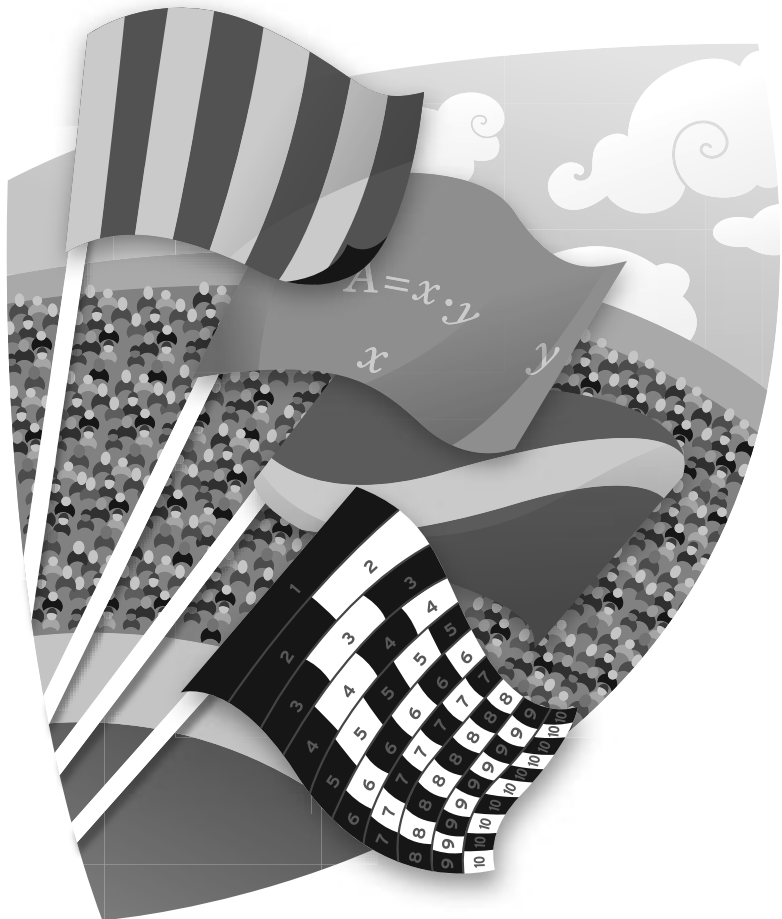
**Jere Confrey**

*North Carolina State University, Raleigh, North Carolina*

**Alan Maloney**

*North Carolina State University, Raleigh, North Carolina*

Sagamore 2, Capacity: 190



## **English Learners' Mathematical Thinking When Taught Mathematics Vocabulary**

This study examined English learners' mathematical thinking during a fractions unit that included mathematics vocabulary. Students engaged in mathematical discourse using mathematics vocabulary and everyday language, gained both procedural and conceptual knowledge of fractions, and expressed greater confidence in their mathematics abilities.

**Eula Ewing Monroe**

*Brigham Young University, Provo, Utah*

**Hilary H. Webb**

*Brigham Young University, Provo, Utah*

**Damon L. Bahr**

*Brigham Young University, Provo, Utah*

## **Middle School Experiences as a Foundation to Success in Algebra**

This study draws from a longitudinal sample of ethnically diverse middle school students to examine the development of conceptual understanding in algebra and the impact of reform-based instruction. The results showed that gains in conceptual understanding in middle school predicted higher levels of algebraic achievement across all students.

**Carol E. Malloy**

*University of North Carolina at Chapel Hill; McGraw-Hill K-12 Mathematics; Chapel Hill, North Carolina*

**Beverly Glienke**

*University of North Carolina at Chapel Hill, Chapel Hill, North Carolina*

## **Success Made Probable: African-American Girls' Statistics Explorations Using Problem-Based Learning**

The speakers will present findings from a study that examined changes in elementary-school-aged, African-American girls' mathematical understanding and academic identity following engagement in a project-based statistics unit.

**Olufunke Adefope**

*Indiana University Bloomington, Bloomington, Indiana*

**Mi Yeon Lee**

*Indiana University Bloomington, Bloomington, Indiana*

**Lauren Rapacki**

*Indiana University Bloomington, Bloomington, Indiana*

**Discussant: Dorothy Y. White**

*University of Georgia, Athens, Georgia*

Sagamore 3, Capacity: 210



# 110

## The High-School-to-College Mathematics Transition: Challenges and Prospects

### Research Symposium

This session will discuss issues and trends regarding the transition from high school to college. Topics will include national data on students' course taking, curricular efforts to support STEM- and non-STEM-intending students, the nature and effect of high school calculus, and the implications of the new common core standards.

#### **Cathy Seeley**

*Past President, NCTM; Charles A. Dana Center; University of Texas at Austin, Austin, Texas*

#### **Karen Marrongelle**

*Portland State University, Portland, Oregon*

#### **Christian R. Hirsch**

*Western Michigan University, Kalamazoo, Michigan*

#### **Discussant: William McCallum**

*University of Arizona, Tucson, Arizona*

Sagamore 4, Capacity: 546

## **How Mathematics Challenges and Opportunities Can Change Beginning Teachers' Beliefs**

This talk will examine early-career elementary school teachers' mathematics challenges and opportunities enacting standards-based curricula. It will probe roles that the challenges and opportunities played in changing the teachers' mathematics beliefs and discuss implications for elementary school teacher education and professional development.

**Joan Gujarati**

*Manhattanville College, Purchase, New York*

## **Preventing the Achievement Gap: Professional Development in Foundational Mathematics**

Efforts to train early childhood teachers in mathematics are rare and often of limited effectiveness. This presentation will describe foundational mathematics, an important conceptual framework for mathematics professional development for teachers of young children. The speakers will present results of a successful intervention based on this idea.

**Jennifer S. McCray**

*Erikson Institute, Chicago, Illinois*

**Yinna Zhang**

*Erikson Institute, Chicago, Illinois*

**Jie-Qi Chen**

*Erikson Institute, Chicago, Illinois*

## **Third-Grade Teachers' Instructional Quality, Knowledge, and Efficacy in Mathematics**

This study determined profiles among third-grade teachers regarding their mathematics instructional quality, knowledge, and efficacy; and described each profile's mathematics instructional practices. Quantitative results revealed three profiles; qualitative findings showed how their differences affected students' opportunities to learn.

**Temple Walkowiak**

*North Carolina State University, Raleigh, North Carolina*

**Robert Berry**

*University of Virginia, Charlottesville, Virginia*

**Sara Rimm-Kaufman**

*University of Virginia, Charlottesville, Virginia*

**Discussant: Julie Sarama**

*University at Buffalo, State University of New York, Buffalo, New York*

Sagamore 5, Capacity: 210

# 112

## Investigating Early Algebra Learning Progressions for Grades 3–8

### Work Session

This working session will critique conjectured Early Algebra Learning Progressions (EALPs) for grades 3–8. EALPs that bridge research and practice in algebra learning between elementary and middle grades are crucial first steps in developing elementary grades interventions that examine effects of current reforms' longitudinal approach to algebra.

#### **Maria Blanton**

*University of Massachusetts Dartmouth, Fairhaven, Massachusetts*

#### **Ana Stephens**

*University of Wisconsin—Madison, Madison, Wisconsin*

#### **Timothy Marum**

*University of Massachusetts Dartmouth, Fairhaven, Massachusetts*

#### **Angela Murphy Gardiner**

*University of Massachusetts Dartmouth, Fairhaven, Massachusetts*

#### **Eric Knuth**

*University of Wisconsin—Madison, Madison, Wisconsin*

Sagamore 6, Capacity: 150



# 113

## Examining the Use of Rehearsals to Support Novice Teachers' Ambitious Teaching

### Work Session

This working session will examine the use of rehearsals as a pedagogical tool for supporting novice teachers' ability to teach ambitiously. The speakers will discuss the coding used to investigate how rehearsals support novice teachers' learning and data on the teacher educators' role in leading rehearsals and tuning novice teachers' performance.

#### **Megan Franke**

*University of California at Los Angeles, Los Angeles, California*

#### **Elham Kazemi**

*University of Washington, Seattle, Washington*

#### **Magdalene Lampert**

*University of Michigan, Ann Arbor, Michigan*

#### **Hala Ghouseini**

*University of Wisconsin—Madison, Madison, Wisconsin*

#### **Angela Chan Turrou**

*University of California at Los Angeles, Los Angeles, California*

#### **Heather Beasley**

*University of Michigan, Ann Arbor, Michigan*

#### **Adrian Cunard**

*University of Washington, Seattle, Washington*

Sagamore 7, Capacity: 190



# 114

## **Strategic Judgment: The Missing Paradigm in Mathematics Teacher Preparation**

### **Research Symposium**

This symposium will argue for an approach to teacher preparation in which preservice teachers strengthen their strategic pedagogical judgment through reflective work with what we call “knowledge-practice heuristics,” or “what if” scenarios that pair particular mathematical topics with specific pedagogical moves.

#### **Sandra Crespo**

*Michigan State University, East Lansing, Michigan*

#### **Ann Lawrence**

*Michigan State University, East Lansing, Michigan*

#### **Aaron Brakonieccki**

*Michigan State University, East Lansing, Michigan*

#### **Justin N. Thorpe**

*Michigan State University, East Lansing, Michigan*

#### **Curtis Lewis**

*Michigan State University, East Lansing, Michigan*

#### **Leslie Dietiker**

*Michigan State University, East Lansing, Michigan*

#### **Discussant: Deborah Schifter**

*Center for the Development of Teaching, Newton, Massachusetts*

201, Capacity: 84

# 115

## **A Lens for Analyzing Coaches' and Teachers' Equity Pedagogy**

### **Research Symposium**

This symposium will present results of three studies using an equity pedagogy code book to analyze mathematics coaches' and teachers' application of equity pedagogy elements in narrative responses and teachers' application of them in practice.

#### **Diana B. Erchick**

*Ohio State University at Newark, Newark, Ohio*

#### **Michael D. Dornoo**

*Ohio State University at Newark, Newark, Ohio*

#### **Manjula P. Joseph**

*Ohio State University, Columbus, Ohio*

#### **Discussant: Cynthia A. Tyson**

*Ohio State University, Columbus, Ohio*

202, Capacity: 87

# 116

## Measurement Research and Practice

### Research Symposium

This symposium will present different perspectives on research on measurement and share that research's latest results. The speakers will describe four programs—on learning trajectories, concepts of unit, and relationships among different attributes and number— and follow with a structured audience participation.

#### **Douglas Clements**

*University at Buffalo, State University of New York, Buffalo, New York*

#### **Jennifer McDonel**

*University at Buffalo, State University of New York, Buffalo, New York*

#### **Doug van Dine**

*University at Buffalo, State University of New York, Buffalo, New York*

#### **Barbara J. Dougherty**

*Iowa State University, Ames, Iowa*

#### **Jack Smith**

*Michigan State University, East Lansing, Michigan*

#### **Craig J. Cullen**

*Illinois State University, Normal, Illinois*

#### **Jeffrey E. Barrett**

*Illinois State University, Normal, Illinois*

#### **Julie Sarama**

*University at Buffalo, State University of New York, Buffalo, New York*

203, Capacity: 90

# 117

## Examining Preservice Teachers' Metacognition of Place-Value Concepts

### Work Session

This session will highlight an approach that creates disequilibrium in grades K–2 teachers regarding their place-value understanding and encourages metacognition. The audience will engage in the theoretical and conceptual underpinnings of developing the mathematical knowledge needed for teaching place-value concepts.

#### Jo Ann Cady

*University of Tennessee, Knoxville, Tennessee*

#### Jamie Price

*East Tennessee State University, Johnson City, Tennessee*

#### Cheryl A. Lubinski

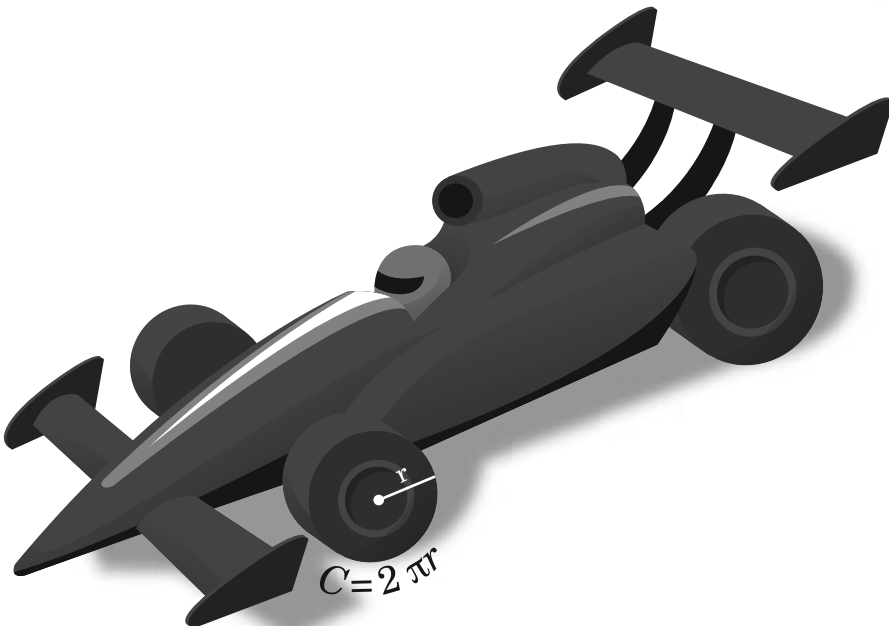
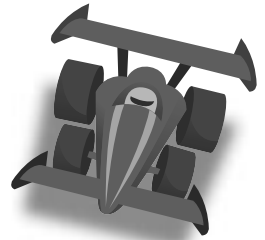
*Illinois State University, Normal, Illinois*

#### Karen Lucas

*University of Tennessee, Knoxville, Tennessee*



204, Capacity: 100





**118** Interactive Paper Session**Lead Teachers' Competence, Confidence, and Credentials, and Their Students' Academic Achievement**

Rice University's Mathematics Leadership Institute, developed with two Houston-area school districts, addresses effective, campus-based, high school mathematics leadership by developing lead teachers. The speakers will present statistics showing enhanced content knowledge, preparedness to teach, self-efficacy, credentials, and students' achievement

**Ngozi Kamau**

*Rice University, Houston, Texas*

**Cynthia Knowles**

*Rice University Mathematics Leadership Institute, Noyce Scholar, Houston, Texas*

**Middle and High School Mathematics Teachers' Differences in Alternative Certification**

This study examined the differences in content knowledge, attitudes toward mathematics, and concepts of teacher self-efficacy among several different types of teachers in the New York City Teaching Fellows program. The results guide teacher education in mathematics alternative certification.

**Brian R. Evans**

*Pace University, New York, New York*

**Discussant: Kathryn Chval**

*University of Missouri—Columbia, Columbia, Missouri*

Sagamore 1, Capacity: 280

**119****Listening to Children's Mathematical Reasoning**

Work Session

Teachers often speak of teaching as listening, but seldom encounter it in practice. This work session will listen to children's reasoning as evidenced in their language, discursive practices, and mathematical representations as they share solutions to a geometry problem.

**Barbara Graves**

*University of Ottawa, Ottawa, Canada*

Sagamore 2, Capacity: 190

## **A Modified Framework for Analyzing Teachers' Learning Online**

The speakers will discuss an aspect of a project that extends existing research on professional teaching communities to an online environment. They will investigate what aspects of an existing analytical framework that investigates professional teaching communities' learning are transferable to online environments.

**Chrystal Dean**

*Appalachian State University, Boone, North Carolina*

**Jason Silverman**

*Drexel University, Philadelphia, Pennsylvania*

## **Developing and Enhancing Teachers' TPACK**

The speakers will report findings of their synthesis of what they currently know about preparing future teachers to integrate technology into their teaching. They will also make recommendations on areas that need additional research and engage participants will be engaged in a discussion of TPACK for mathematics educators.

**Shannon Driskell**

*University of Dayton, Dayton, Ohio*

**Christine A. Browning**

*Western Michigan University, Kalamazoo, Michigan*

**Margaret L. Niess**

*Oregon State University, Corvallis, Oregon*

**Christopher Johnston**

*George Mason University, Fairfax, Virginia*

**Rachel A. Harrington**

*Western Oregon University, Monmouth, Oregon*

## **Supporting Teachers' Developing Instrumental Genesis with Dynamic Mathematical Software**

This research is the product of a two-year study of technologically rich learning environments designed for graduate students studying mathematics education. The main research question of interest asked what characteristics of a learning environment might support students' progress toward instrumental genesis using dynamic cognitive learning tools.

**Sandra Madden**

*University of Massachusetts Amherst, Amherst, Michigan*

**Discussant: Karen F. Hollebrands**

*North Carolina State University, Raleigh, North Carolina*

Sagamore 3, Capacity: 210

# 121

## Research Opportunities Arising from the Standards for Mathematical Practice

### Research Symposium

The standards for mathematical practice in the Common Core State Standards for Mathematics provide guidance and convey expectations about the “varieties of expertise that mathematics educators at all levels should seek to develop in their students.” This session will address related research opportunities in curriculum, teaching, and assessment.

#### **Fran Arbaugh**

*Pennsylvania State University, University Park, Pennsylvania*

#### **Harold Asturias**

*University of California, Berkeley, Berkeley, California*

#### **Al Cuoco**

*Center for Mathematics Education, Education Development Center, Newton, Massachusetts*

#### **Discussant: Valerie Mills**

*National Council of Supervisors of Mathematics; Oakland Schools Regional Resource Center, Waterford, Michigan*

Sagamore 4, Capacity: 546

## **Comparing Effects of Two Formative-Assessment Professional Development Models**

The presentation will describe different models of professional development that use formative assessment with networked technology, along with effects on teachers' confidence, self-efficacy, value and interest in technology, and knowledge about assessment. The speakers will share comparisons of changes after each model's first and second year.

**Melfried Olson**

*University of Hawaii, Honolulu, Hawaii*

**Yue Yin**

*University of Illinois at Chicago, Chicago, Illinois*

**Hannah Slovin**

*University of Hawaii, Honolulu, Hawaii*

## **Connecting Professional Development to Teachers' Learning and Instructional Change**

This session will present research on secondary school mathematics teachers' learning and instructional change following professional development that focused on selecting and implementing cognitively challenging tasks. The speaker will explore how changes in teachers' knowledge and practices connected to their professional learning.

**Melissa Boston**

*Duquesne University, Pittsburgh, Pennsylvania*

## **Hard Evidence: High School Mathematics Teachers Engaging in Inquiry**

Teachers have heard widespread calls to engage in evidence-based inquiry into their own teaching in an effort to improve it. This study examines what five high school mathematics teachers did when consistently asked for evidence of improvement in teaching for conceptual understanding in mathematics.

**Robert Wieman**

*University of Delaware, Newark, Delaware*

**Discussant: Michelle Cirillo**

*University of Delaware, Newark, Delaware*

Sagamore 5, Capacity: 210

# 123

## Learning to Build on Children’s Thinking through Curriculum Materials

### Work Session

The speaker’s team has developed a series of activities and video-based materials for elementary methods courses grounded in the idea that educative features in Standards-based curricula can help teachers learn about and support children’s mathematical thinking. They will share activities and evidence of preservice teachers’ learning.

#### **Corey Drake**

*Iowa State University, Ames, Iowa*

#### **Molly Sweeney**

*Des Moines Public Schools, Des Moines, Iowa*

#### **Jennifer Johnson**

*Des Moines Public Schools, Des Moines, Iowa*

#### **Natalie Franke**

*Des Moines Public Schools, Des Moines, Iowa*

#### **Andrew M. Tyminski**

*Clemson University, Clemson, South Carolina*

#### **Alejandro Andreotti**

*Iowa State University, Ames, Iowa*

#### **Tonia J. Land**

*Iowa State University, Ames, Iowa*

Sagamore 6, Capacity: 150

# 124

## Teachers' Specialized Knowledge: Task Use in Classrooms and Professional Education

### Work Session

This session will describe four research projects taking up teachers' specialized content knowledge development by studying the function of mathematical tasks in classroom practice and professional education. The speakers will consider improved designs for professional education that meet teaching's subject matter demands.

#### **Rebekah Elliott**

*Oregon State University, Corvallis, Colorado*

#### **Judith Mumme**

*WestEd, San Francisco, California*

#### **Karen Marrongelle**

*Portland State University, Portland, Oregon*

#### **Erin Baldinger**

*Stanford University, Stanford, California*

#### **Hilda Borko**

*Stanford University, Stanford, California*

#### **Karen Koellner**

*Hunter College, City University of New York, New York*

#### **Suzanne H. Chapin**

*Boston University, Boston, Massachusetts*

#### **Nancy Anderson**

*Boston University, Boston, Massachusetts*

Sagamore 7, Capacity: 190

# 125

## Helping Teachers Adapt Instruction to Promote Mathematical Thinking

### Research Symposium

This session will explore ways to adapt teaching and consider professional development's role in the adaptation process. The speakers will address how practicing teachers learn to adapt mathematical curricula for instruction and discuss effects of prospective teachers' learning, beliefs, and teaching contexts on their instructional adaptations.

#### **Aki Murata**

*Stanford University, Stanford, California*

#### **Benjamin Hedrick**

*Stanford University, Stanford, California*

#### **Sarah Kate Selling**

*Stanford University, Stanford, California*

#### **Erin Baldinger**

*Stanford University, Stanford, California*

#### **Laura Bofferding**

*Stanford University, Stanford, California*

#### **Megan W. Taylor**

*Harvard University, Cambridge, Massachusetts*

201, Capacity: 84

# 126

## Longitudinal Changes in Teachers' Knowledge and Students' Achievement

### Research Symposium

This symposium will examine what systemic change in teachers' knowledge, classroom practice, and students' achievement looks like when multilevel effects are explicitly modeled. Presentations will focus on issues of estimating individual students' and teachers' growth when participants are part of coherent cultural groups in social institutions.

#### **James A. Middleton**

*Arizona State University, Tempe, Arizona*

#### **Finbarr Sloane**

*University of Colorado at Boulder, Boulder, Colorado*

#### **Seong Hee Kim**

*Arizona State University, Tempe, Arizona*

#### **Hyun Jung Kang**

*Arizona State University, Tempe, Arizona*

#### **Paula Guerra-Lombardi**

*Arizona State University, Tempe, Arizona*

#### **Jennifer Oloff-Lewis**

*Arizona State University, Tempe, Arizona*

202, Capacity: 87

# 127

## Sequences and Transitions in Grades K–12 Geometry Textbooks

### Research Symposium

This symposium will challenge unexplored assumptions about sequences in which U.S. geometry textbooks present mathematical ideas and activities. The speakers will describe these sequences as curricular storylines, analyze verbal and visual storylines offered by textbooks, and explore how sequences promote and limit geometry construction.

#### **Aaron Brakoniecki**

*Michigan State University, East Lansing, Michigan*

#### **Leslie Dietiker**

*Michigan State University, East Lansing, Michigan*

#### **Discussant: Kristen Bieda**

*Michigan State University, East Lansing, Michigan*

203, Capacity: 90



# 128

## Creating a Framework to Examine Mathematics Teachers' Exploratory Data Analysis

### Work Session

Several U.S. institutions implemented an NSF-funded curriculum for mathematics teachers, focusing on data analysis and probability. The presenters will share a self-developed coding tool to analyze teachers' reports of their exploratory data analysis. Participants will analyze, use, and critique the coding tool.

#### **Hollylynne Lee**

*North Carolina State University, Raleigh, North Carolina*

#### **Shannon Driskell**

*University of Dayton, Dayton, Ohio*

#### **Suzanne Harper**

*Miami University, Oxford, Ohio*

#### **Dustin L. Jones**

*Sam Houston State University, Huntsville, Texas*

#### **Gladis Kersaint**

*University of South Florida, Tampa, Florida*

204, Capacity: 100



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## **Developing Young Children's Qualitative Geometric Reasoning**

Children's geometry experiences are mostly Euclidean, but they also have nonmetric ideas. Supported by a specially designed, interactive geometry environment, the speaker conducted a teaching experiment with two children. He found that the children developed significant, authentic forms of what he called qualitative geometric reasoning.

**Steven Greenstein**

*University of the Virgin Islands, Saint Thomas, Virgin Islands*

## **The Impact of Advanced Primary School Geometry and Measurement Curriculum**

This session will present research findings, activities, and students' work from Project M2, funded by an NSF grant to nurture talent in all young students. The project presented advanced content in depth and encouraged students to think like mathematicians. Results show that these students significantly outperformed their peers.

**M. Katherine Gavin**

*University of Connecticut, Storrs, Connecticut*

**Tutita Casa**

*University of Connecticut, Storrs, Connecticut*

**Jill Adelson**

*University of Louisville, Louisville, Kentucky*

**Discussant: Rich Lehrer**

*Vanderbilt University, Nashville, Tennessee*

Sagamore 1, Capacity: 280

# 130

## Supporting and Studying Teachers' Learning about Reasoning and Proving

### Work Session

This session will analyze and discuss a set of teacher education materials that develop teachers' capacity to reason, prove, and engage their students productively in such practices. The speakers will present data from a pilot study of teachers' learning from the materials.

#### **Margaret Smith**

*University of Pittsburgh, Pittsburgh, Pennsylvania*

#### **James Greeno**

*University of Pittsburgh, Pittsburgh, Pennsylvania*

#### **Justin D. Boyle**

*University of Pittsburgh, Pittsburgh, Pennsylvania*

#### **Evelyn Gordon**

*Horizon Reserach Inc., Chapel Hill, North Carolina*

Sagamore 2, Capacity: 190



## **Modeling Variation in Students' Mathematics Achievement in a Reform Curricula**

Using hierarchical linear modeling to account for variation in students' achievement, the speakers will give an overview of the impact of the reform-based Core-Plus Mathematics curricular materials on students' test scores. They will examine how teachers' participation in a state-funded professional development affected students' achievement.

**Erin Elizabeth Krupa**

*North Carolina State University, Raleigh, North Carolina*

**Jere Confrey**

*North Carolina State University, Raleigh, North Carolina*

## **Reasoning and Proof in Reform and Conventional Mathematics Textbooks**

This session describes the results of an analysis of the written curriculum for reasoning and proof elements using an adapted framework. The analysis compared chapters on polynomial functions from a reform-oriented high school mathematics textbook and a conventional high school textbook.

**Jon D. Davis**

*Western Michigan University, Kalamazoo, Michigan*

## **Textbook Analysis: The Case of High School Algebra**

Curriculum materials strongly determine what students have an opportunity to learn, yet vast differences exist in the algebra strands of commercially available secondary school textbooks. The speakers will present data from a textbook analysis project that characterized these differences coherently, comprehensively, and commensurably.

**Mary Ann Huntley**

*Cornell University, Ithaca, New York*

**Maria Terrell**

*Cornell University, Ithaca, New York*

**Discussant: Sharon L. Senk**

*Michigan State University, East Lansing, Michigan*

Sagamore 3, Capacity: 210

# 132

## Research on Technology in Mathematics Education: Current Efforts and Future Directions

### Research Symposium

This session focuses on current research efforts regarding technology in mathematics education, including research related to digital technologies, dynamic software, and video gaming. The session participants will also discuss future directions regarding research on technology in mathematics education.

#### **Eric Knuth**

*University of Wisconsin—Madison, Madison, Wisconsin*

#### **Stephen Hegedus**

*University of Massachusetts-Dartmouth, North Dartmouth, Massachusetts*

#### **Nathalie Sinclair**

*Simon Fraser University, Burnaby, British Columbia, Canada*

#### **John Olive**

*University of Georgia, Athens, Georgia*

#### **Melissa Gresalfi**

*Indiana University Bloomington, Bloomington, Indiana*

#### **Discussant: Janet Bowers**

*San Diego State University, San Diego, California*

#### **Discussant: Walter Stroup**

*University of Texas, Austin, Texas*

Sagamore 4, Capacity: 546

## **Exploring the Mathematics Resocialization Processes of Three Latino Students**

Using the notion of the zone of mathematical practice, we analyzed three Latino students' trajectories (grades 3–6) in an after-school mathematics program. Results demonstrate that students took on new roles participating in mathematical meaning-making through mathematical talk, new use of tools, social networking, and playful interactions.

**Carlos Lopez Leiva**

*University of Illinois at Chicago, Chicago, Illinois*

**Gabriel Viego**

*University of Illinois at Chicago, Chicago, Illinois*

**Zayoni Torres**

*University of Illinois at Chicago, Chicago, Illinois*

## **Identities and Gatekeepers: Postsecondary Transitions for African American Students**

What mathematics identities are students constructing, rejecting, and repairing throughout the transition to postsecondary remedial math courses? This presentation will feature the structure and findings of case-study research centered on mathematics engagement and identity work among African American students.

**Gregory Larnell**

*Michigan State University, East Lansing, Michigan*

## **What Makes Me Smart? Students' Positioning in High School Mathematics**

This session will present results of a qualitative case study of students' group interactions in a high school mathematics class. The study investigated (1) how five students negotiated their own and peers' academic status and (2) how they viewed themselves and their peers as smart in mathematics.

**Teresa K. Dunleavy**

*University of Washington, Seattle, Washington*

**Discussant: Victoria Hand**

*University of Colorado at Boulder, Boulder, Colorado*

Sagamore 5, Capacity: 210

**134****Algebraically Rich Tasks: Linking Instructional Practices and Students' Understanding****Work Session**

This session will present findings linking classroom practices and students' learning in algebra. The speakers will highlight challenges of building an observation scheme to capture classroom practices and developing assessments to measure students' understanding. They will discuss the coding scheme, sample tasks, and classroom video.

**Jamie L. W. Wernet**

*Michigan State University, East Lansing, Michigan*

**Kimberly Seashore**

*University of California-Berkeley, Berkeley, California*

**Jerilynn Lepak**

*Michigan State University, East Lansing, Michigan*

Sagamore 6, Capacity: 150

**135****Learning to Do Mathematics as a Teacher****Work Session**

What are the mathematical demands of teaching? How can teachers learn to do the specialized work of mathematics teaching? Explore these questions by focusing on a selection of cases and considering how mathematical knowledge for teaching is used to manage recurrent problems of practice.

**Meghan M. Shaughnessy**

*University of Michigan, Ann Arbor, Michigan*

**Deborah Loewenberg Ball**

*University of Michigan, Ann Arbor, Michigan*

**Hyman Bass**

*University of Michigan, Ann Arbor, Michigan*

**Yeon Kim**

*University of Michigan, Ann Arbor, Michigan*

**Yvonne Lai**

*University of Michigan, Ann Arbor, Michigan*

**Laurie Sleep**

*University of Michigan, Ann Arbor, Michigan*

**Minsung Kwon**

*University of Michigan, Ann Arbor, Michigan*

**Mark Thames**

*University of Michigan, Ann Arbor, Michigan*

Sagamore 7, Capacity: 190

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# Notes

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