



Program for the Research Presession

The 79th Annual Meeting of the National Council of Teachers of Mathematics

2–4 April 2001

**Orange County
Convention Center
Orlando, Florida**



Sponsored by

Research Advisory Committee of the
National Council of Teachers of Mathematics

Special Interest Group for Research in
Mathematics Education of the American Educational
Research Association

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Sunday Ajose, *Steering
Committee*

East Carolina State University

Announcements

Informal meetings can be held Tuesday, 3 April, in Room 331 from 8:30 a.m.–4:30 p.m. and in Room 332 from 10:15–11:45 a.m. and 1:00–4:30 p.m. Meetings can also be held on Wednesday, 4 April, in Room 331 from 8:30–10:00 a.m. and in Room 332 from 8:30–1:00 p.m.

A brown-bag discussion, “Establishing Research Working Groups,” will be held Tuesday, 12:00 noon–12:45 p.m.

A brown-bag discussion for graduate students will be held Wednesday, 12:00 noon–1:15 p.m., in Room 331 during the lunch break. Graduate students will have an opportunity to gather informally to meet and chat with one another (or with anyone else who cares to join them).

The Call for Papers for the next Research Pre-session, to be held in Las Vegas, Nevada, in April 2002, will be available at the registration table.

Special thanks to Lawrence Erlbaum Associates, Inc., for their

Monday, 2 April 2001, 7:00 p.m. (Welcome)

Organizers:

Patricia P. Tinto, Syracuse University
Chair, NCTM Research Advisory Committee

Norma Presmeg, Illinois State University
Cochair, SIG/RME of AERA

7:30 p.m. (Opening Address)

This is a joint session with NCSM

Studying Standards: NCTM's Standards Impact Research Group, Updates and Issues

Speaker

Joan Ferrini-Mundy, Michigan State University

NCTM's Standards Impact Research Group (SIRG) has been formed to study the influence and implementation of standards. A panel of committee members will discuss how SIRG is framing these questions and its plans to study the implementation efforts that NCTM and others initiate. This session is the first opportunity to discuss the SIRG initiatives with the mathematics education community and to seek advice and help. SIRG is interested in engaging researchers, teachers, and policymakers in a comprehensive effort to better understand how standards are used and how they can make a difference in improving grades pre-K–12 mathematics education.

Hall F5, Convention Center

Reception follows.

Foyer outside Room 330, Convention Center

**Tuesday, 3 April 2001, 8:30 a.m.–10:00 a.m.
(Concurrent Sessions)**

Teachers' Use of Data to Support Mathematics Implementation Research

Organizer/Presenter

Jere Confrey, University of Texas at Austin

Presenters

Kaye Forgione, University of Texas at Austin

Anthony Petrosino, University of Texas at Austin

Jack Dieckmann, University of Texas at Austin

Rebie Nicholson, University of Texas at Austin

Katie Makar, University of Texas at Austin

Jennifer Wilhelm, University of Texas at Austin

Participants will be involved in sustained interactions that use multiple approaches to build and analyze teachers' professional competencies and conceptual understanding of data analysis as a tool for making instructional decisions. Discussions will focus on work being done in secondary schools in an urban Texas school district.

Room 340 A/B, Convention Center

Involving Teachers in Research on Students' Statistical Understanding

Organizer

Tim Kelly, Hamilton College

Presenters

Richard Lehrer, University of Wisconsin—Madison

Clifford Konold, University of Massachusetts

Khalimahtul Khalil, University of Massachusetts

Kay McClain, Vanderbilt University, Peabody College

Presenter/Discussant

Patrick Thompson, Vanderbilt University, Peabody College

This session focuses on research involving the active participation of classroom teachers in the creation, exploration, and reporting of cases documenting the development of statistical reasoning and data analysis capacities in both teachers and students.

Room 332, Convention Center

Teaching Preservice Mathematics Teachers How to Teach: Perspectives and Approaches within and across Education Systems

Organizer/Presenter

Yeping Li, University of New Hampshire

Presenters

Ho Kheong Fong, Nanyang Technological University, Singapore

Jane-Jane Lo, Cornell University

Wei Sun, Towson University

Randolph Philipp, San Diego State University

Discussant

Glenda Lappan, Michigan State University

Teaching preservice mathematics teachers how to teach is an important component of teacher education programs and needs to be explored. This symposium is designed to examine relevant perspectives and approaches used and discuss their effects both within and across education systems.

Room 340 C/D, Convention Center

Semiotic Chaining Linking Everyday Practices and Classroom Mathematics

Organizer/Presenter/Presenter

Norma Presmeg, Illinois State University

Presenters

Matthew Hall, Florida State University

Cheryl Hunt, Illinois State University

Discussant

Judit Moschkovich, University of California—Santa Cruz

This work session introduces attendees to the theory and significance of semiotic chaining as a tool for teachers to link everyday practices of students and grades K–8 classroom mathematics. Presenters will provide examples before attendees work together to create their own chains.

Room 330 A/B/C, Convention Center

How Can Research Support Assessment Reform? Using “Rich” Assessment Tasks to Support Standards-Oriented Teaching and Learning?

Organizer/Presider/Presenter

Dianne Siemon, RMIT University, Australia

Presenters

Max Stephens, Ministry of Education, Victoria and RMIT University, Australia

Marja van den Heuvel-Panhuizen, Freudenthal Institute, University of Utrecht, The Netherlands

Discussant

Diane Briars, Pittsburgh Public Schools

How can valid, reliable forms of assessment be used by teachers to provide a middle road among the educational systems' desire for quality data, the implementation of standards-based frameworks, and the need to actively engage teachers as professionals in reform?

Room 330 E/F/G, Convention Center

10:15 a.m.–11:45 a.m. (Concurrent Sessions)

Studying Professional Development Is Messy Work. What Are the Research Issues?

Organizer/Presider

Catherine Brown, Indiana University Bloomington

Presenters

Fran Arbaugh, University of Missouri at Columbia

P. Michael Lutz, California State University, Bakersfield

Rebecca McGraw, Indiana University Bloomington

This work session will address research issues related to studying forms of professional development that involve intense, collaborative work by groups of teachers, teacher educators, and others.

Room 340 C/D, Convention Center

What Should Be the Research Preparation of Doctorates in Mathematics Education?

Organizer

Robert Reys, University of Missouri at Columbia

Presenters

Jere Confey, University of Texas

David C. Johnson, King's College, University of London

Frank Lester, Indiana University Bloomington

Thomas Lingefjärd, Gothenburg University

Carolyn Maher, Rutgers University

Should the focus of the doctoral program in mathematics education be on helping doctoral students become wise and efficient users of research or producers of new research? Are these two goals different? Is there a "core" set of experiences for all? These and other issues will be addressed.

Room 330 E/F/G, Convention Center

Nurturing Algebraic Thinking in the Early Grades

Organizer/Presider/Presenter

Analucía D. Schliemann, Tufts University

Presenters

Paul Goldenberg, Education Development Center

Jorge Tarcísio da Rocha Falcão, Universidade Federal de Pernambuco, Brazil

David Carraher, TERC

Bárbara M. Brizuela, Harvard University and TERC

Darrell Earnest, TERC

Anne Goodrow, Boston Public Schools

Susanna Lara-Roth, Tufts University

The papers in this symposium recognize children's abilities to reason algebraically and explore different perspectives in which algebraic thinking might be successfully nurtured in the early elementary school years. Results from experimental implementations in second and third grade will be presented.

Room 330 A/B/C, Convention Center

Supporting Mathematics Teachers' Developing Assessment for Learning

Organizer

Dylan Wiliam, King's College, University of London

Discussant

Jo Boaler, Stanford University

The aim of this workshop is to explore ways in which mathematics teachers can be supported in their attempts to integrate assessment into their day-to-day classroom activities. Although materials from current research projects will be available, it is envisaged that most of the available time will be spent in discussion.

Room 340 A/B, Convention Center

12:00 p.m.–12:45 p.m. (Brown Bag Lunch)

Establishing Research Working Groups

Organizers

Frank Lester, Indiana University Bloomington

Douglas Grouws, University of Iowa

This session is being offered to allow researchers with similar interests time to discuss their work, to find out what others are doing in a particular area, and to identify individuals who may be interested in developing a "working group" around specific research interests. It is an opportunity to begin a network to exchange mutually supportive research ideas and to encourage continued discussion and generation of research in a particular area. Pre-session participants will be given the opportunity to propose a working group area of interest. These will be posted/announced and interested people are encouraged to attend. By the end of the session, those deciding to form a working group will need to provide a working group name, select a group facilitator, and submit a roster of names and contact information.

Room 332, Convention Center

1:00 p.m.–3:30 p.m. (Concurrent Sessions)

Research on Technology in the Teaching and Learning of Mathematics: Syntheses and Perspectives

Organizers/Discussants

M. Kathleen Heid, Penn State University
Glendon W. Blume, Penn State University

Presenters

Douglas Clements, State University of New York at Buffalo
David Smith, Duke University
Rose Mary Zbiek, University of Iowa

Discussants

John Olive, University of Georgia
Julie Sarama, State University of New York at Buffalo

This session will address issues related to mathematics learning and teaching in the context of technology. Presenters are authors of research synthesis chapters in *Research on Technology in the Learning and Teaching of Mathematics: Volume I: Learning, Teaching, and Equity*.

Room 330 E/F/G, Convention Center

Teacher Education from a Modeling Perspective

Organizer/Presenter

Karen Koellner Clark, Georgia State University

Presenters

James A. Middleton, Arizona State University
Roberta Y. Schorr, Rutgers University
Kay McClain, Vanderbilt University

Discussant

Richard Lesh, Purdue University

This symposium is intended to provide four perspectives on teacher education that support the current reform movement in mathematics education. These presentations are all grounded in a modeling perspective, yet each takes a different epistemological and theoretical framework.

Room 340 C/D, Convention Center

Student Patterns of Geometrical Reasoning within a Technological Environment

Organizer

Barbara Pence, San Jose State University

Presenters

Colette Laborde, Laboratoire IMAG—Leibniz, Université

Joseph Fourier

Ferdinando Arzarello, University of Torino

Discussant

Zalman Usiskin, University of Chicago

This symposium will support and extend research into patterns that develop as students create geometrical proofs in interactive geometry environments. Many lenses will be brought to bear in the analysis of geometrical reasoning, reflecting specific and complex mental processes combined with perceptions and actions within the technological environments.

Room 340 A/B, Convention Center

Exploring Teacher-Researcher Collaborations in Mathematics Education Research

Organizer

Gini Stimpson, University of Washington, Research Advisory Committee

Panelists

Fred Longhart, Flathead High School, Kalispell, Montana

Virginia Bastable, Mt. Holyoke College

Nancy Horowitz, Springfield Public Schools, Springfield, Massachusetts

Marc Driscoll, Education Development Center

Bill Jackson, Paterson Public School #2, Paterson, New Jersey

Clea Fernandez, Columbia University

Discussant

Beatriz S. D'Ambrosio, Indiana University—Purdue University Indianapolis

NCTM has funding from the Spencer Foundation to develop a core of teacher/educator researchers who can build, support, and sustain a community of inquiry around teacher/educator research in the area of mathematics education. The two-year plan of action begins with this panel discussion designed to formulate key issues about teacher-researcher work, identifying and clarifying important research questions that might be explored by teacher-researcher teams and elaborating research methods that might be used in answering those questions. The panelists represent varied models of teacher/educator research collaborations.

Room 330 A/B/C, Convention Center

3:45 p.m.–5:15 p.m. (Concurrent Sessions)

Content and Processes Discovered in Asian Elementary and Middle School Mathematics Textbook Series

Organizer/Presider/Presenter

Janice Grow-Maienza, Truman State University

Presenters

Loyce M. Adams, University of Washington

Tad Watanabe, Towson University

Discussant

George Bright, University of North Carolina—Greensboro

This symposium will feature analyses of elementary school and middle school mathematics textbooks from Korea, Singapore, and Japan. The discussion will address NCTM 2000 *Principles and Standards* and will compare the Asian texts with American texts recently developed under National Science Foundation (NSF) full or partial sponsorship.

Room 340 A/B, Convention Center

NSF Investments in Mathematics Education Research

Organizer

Eric Hamilton, National Science Foundation

Presenters

Finbarr (Barry) Sloane, National Science Foundation and

Hewitt Associates, LLC

Lee Zia, National Science Foundation

The National Science Foundation's new programs, Research on Learning and Education (ROLE) and the Inter-Agency Education Research Initiative (IERI), have recently funded their first (ROLE) and second (IERI) sets of education research projects. This session describes the current portfolio and seeks to stimulate strong mathematics education proposals for these programs and to gather advice from researchers on longer-term agenda.

Room 330 A/B/C, Convention Center

Writing About Research for a General Practitioner Audience

Organizer/Panelist

Kathy M. C. Ivey, *JRME* Editorial Panel Chair, Western Carolina University

Panelists

Alfinio Flores, *TCM* Editorial Panel Chair, Arizona State University

Denisse R. Thompson, *MTMS* Editorial Panel Chair, University of South Florida

Rose Mary Zbiek, *MT* Editorial Chair, University of Iowa

The editorial panels of NCTM journals will discuss how to write or rewrite research for a more general practitioner audience. Participants are invited to bring manuscripts or ideas for specific feedback.

Room 330 D, Convention Center

Assessing Quality Assessments: The Effectiveness of Alignment Procedures to Judge Instruments and Tasks

Organizers/Presiders/Presenters

Richard Kitchen, University of New Mexico

Linda Wilson, University of Wisconsin—Madison

Presenters

Gerald Kulm, Texas A&M University

Rolf Blank, Council of Chief State School Officers

Participants will discuss procedures to examine the alignment of standards vis-à-vis mathematics tasks or instruments. Implications for interpreting tests on the basis of alignment procedures and the effectiveness of procedures to identify quality tasks will be discussed.

Room 330 E/F/G, Convention Center

Mathematics-Specific, Field-Based Experiences for Elementary Education Majors: Identifying Fundamental Issues

Organizer/Presider

Paola Sztajn, University of Georgia

Presenters

Beatriz D'Ambrosio, Indiana University–Purdue University
Indianapolis

Diana Lambdin, Indiana University Bloomington

Denise Mewborn, University of Georgia

Dorothy White, University of Georgia

This session will identify issues concerning the organization of mathematics field experiences for preservice elementary teachers. After a brief presentation by each panelist, participants will discuss fundamental issues in the development and implementation of research ideas in mathematics field experiences for elementary majors.

Room 340 C/D, Convention Center

5:30 p.m.

Reception

Room 331, Convention Center

Partial support provided by Lawrence Erlbaum Associates, Inc.

Wednesday, 4 April 2001
8:30 a.m.–10:00 a.m. (Concurrent Sessions)

Teaching Practice as a Medium for Professional Development

Organizer

Gail Burrill, Mathematical Sciences Education Board, National Research Council

Presenters

Deborah Ball, University of Michigan
Hyman Bass, University of Michigan
Zalman Usiskin, University of Chicago

Much professional development provides teachers with knowledge and skill but leaves them to make the necessary connections with their work. This session will build on the proceedings of a joint workshop held in Japan in August 2000 that centered on the study of practice as a vehicle for professional development and was sponsored by the Mathematical Sciences Education Board, the U.S. National Commission on Mathematics Instruction, and Japanese educators. Participants in the session will consider the use of lesson study (kenkyuujugyou), records of instruction, and written cases as a vehicle to develop teachers' understanding of what it takes to teach well.

Room 330 D, Convention Center

Curriculum Research and Development: Three Models

Organizer/Presider/Presenter

Barbara Dougherty, University of Hawaii

Presenter/Moderator

Hannah Slovin, University of Hawaii

Models for developing mathematics curricula are varied. This session presents three approaches for curricula that are based on (1) student learning, (2) instructional approaches, and (3) teacher professional development.

Room 340 C/D, Convention Center

Textbooks and Their Use

Organizer/Presider

Kath Hart, University of Nottingham, United Kingdom

Presenters

Dora Santos Bernard, CINVESTAV, Mexico

Elizabeth Moren, FUNDAO, Brazil

Research on the use of textbooks is scarce, but printed material is used extensively in teaching mathematics, and curriculum is interpreted by authors and publishers. Research with textbooks, teachers, and children will be discussed.

Room E/F/G, Convention Center

Parents as Learners: Engagement in Three Contexts

Organizer/Presenter

Amy Morse, Education Development Center

Presenters

Jan Mokros, TERC

Marta Civil, University of Arizona

Liz Sweeney, Boston Public Schools

This session describes three projects involving parents and mathematics. These projects share a theme of parent involvement and have a particular orientation toward parents. The goals of each project and the opportunities they afford in different content and formats of work will be explored.

Room 330 A/B/C, Convention Center

Understanding Design Elements of Informal Professional Development

Organizers/Presenters

Roya Salehi, The Math Forum

K. Ann Renninger, Swarthmore College

Presenters

Cynthia Lanius, Rice University

Susan Stein, Wilmington Friends, Wilmington, Delaware

Jon Basden, Highland Middle School, Highland, Illinois

Three forms of informal teacher professional development facilitated by The Math Forum are presented as case examples. Discussion will focus on the roles and goals of participants, facilitation of ownership for learning, and the language necessary for changed practice.

Room 340 A/B, Convention Center

10:15 a.m.–11:45 a.m. (Concurrent Sessions)

Research-Based Standards for Pre-K–2 Mathematics: Findings from a National Conference

Organizers/Presenters

Douglas Clements, State University of New York at Buffalo
Julie Sarama, State University of New York at Buffalo

Discussants

Arthur J. Baroody, University of Illinois at Urbana-Champaign
Carol Copple, National Association for the Education of Young
Children
Constance Kamii, University of Alabama
Carolyn Trammell, Georgia Office of School Readiness

Findings from a national conference on early childhood mathematics standards will be presented and discussed. We believe these research-based, detailed guidelines provide a foundation for *specific* frameworks and curricula and an exemplary model that other grade-level bands should follow.

Room 330 A/B/C, Convention Center

Integrating Mathematics and Pedagogy for Preservice Elementary School Teachers: A Study of Beliefs

Organizer/Presenter

Randolph Philipp, San Diego State University

Presenters

Bonnie Schappelle, San Diego State University
Garrett Kenehan, San Diego State University
Tricia Valeski, San Diego State University

Discussants

Steve Williams, Brigham Young University
Martin Simon, Penn State University

Data from a mathematics course and field experience designed to integrate mathematics content and pedagogy for preservice elementary school teachers early in their undergraduate studies will be described and shared. Presenters will also share their difficulties operationalizing their theoretical stance on beliefs in creating their belief instrument.

Room 340 C/D, Convention Center

Drawing on Philosophies of Mathematics and Physical Experiences in Psychologizing the Teaching of Calculus

Organizer/Presenter

Dara Sandow, Michigan State University

Presenters

Marty Schnepf, Holt High School, Holt, Michigan

Bill Rosenthal, Hunter College, City University of New York

In this working session, participants will explore one teacher's efforts to psychologize the teaching of calculus through physical experiences enacted with "line becomes motion" technology, an atypical sequence that starts with accumulation of rates, and a social-constructivist epistemology of mathematics.

Room 340 A/B, Convention Center

Instructional Leaders as Learners: Elementary Principals as Instructional Leaders in Mathematics

Organizer/Co-presenter

Annette Sassi, Education Development Center

Co-presenter

Amy Shulman Weinberg, Education Development Center

This work session uses case excerpts from a study of elementary school principals as instructional leaders to consider the implications of standards-based mathematics instruction on administrative practice. It considers how a stance of learning and reflection influences administrators' work.

Room 330 E/F/G, Convention Center

Educational Quality in the Context of Reform

Organizer/Presenter

Mary C. Shafer, University of Wisconsin—Madison

Chair/Presenter

Thomas A. Romberg, University of Wisconsin—Madison

Presenter

Lesley R. Wagner, University of Wisconsin—Madison

Discussant

Louise Teaf, Red Clay Consolidated School District,
Wilmington, Delaware (retired)

Research documenting the impact on student achievement of *Mathematics in Context*, a standards-based middle school curriculum, will be shared. Linkages among assessment results, classroom instruction, and students' opportunity to learn with understanding will be explored in this presentation.

Room 330 D, Convention Center

**12:00 noon–1:15 p.m. (Graduate Student
Brown-Bag Lunch)**

1:30 p.m.–3:30 p.m. (Concurrent Sessions)

Building the Next Generation of Mathematics Teachers: Recruitment, Preparation, and Retention

Organizers/Presenter

Alice Artzt, Queens College of the City University of New York

Organizer/Presider/Presenter

Frances Curcio, Queens College of the City University of New York

Presenters

Eleanor Armour-Thomas, Queens College of the City University
of New York

Alan Sultan, Queens College of the City University of New York

Discussion Facilitator

Miriam Leiva, University of North Carolina—Charlotte

Reactor

Lew Romagnano, Metropolitan State College of Denver

A comparison and discussion of video clips and profiles of preservice secondary school mathematics teachers generated from longitudinal data will be used to discuss and analyze ways of improving recruitment, preparation, and retention strategies.

Room 340 C/D, Convention Center

Teaching and Learning Mathematics with Understanding in an Era of Accountability and High-Stakes Testing

Organizer/Presider/Presenter

Gerald Kulm, Texas A&M University

Presenters

Becky Burghardt, Oakwood Intermediate School, College Station, Texas
Robert Capraro, Texas A&M University
Mary Margaret Capraro, Texas A&M University
Kristiana Ford, Oakwood Intermediate School, College Station, Texas

The session will outline the apparently opposing goals of teaching for understanding and high-stakes testing in implementing the *Connected Math* program. How mathematics education research can support standards-based teaching and learning will be discussed.

Room 340 A/B, Convention Center

Mentoring Session for Novice Researchers

Organizer

Frank Lester, Indiana University Bloomington

Presenters

A group of experienced researchers will serve as informal mentors.

(The list of mentors will be made available at the conference registration table.)

A group of experienced researchers, representing a diversity of research interests and methodologies, will be available to talk informally with small groups of conference participants about undertaking a personal research agenda. The session will be organized in roundtable format, with each mentor assigned to chat with a roundtable of five to ten participants. Participants will switch tables once or twice during the session so that everyone has the opportunity to interact with more than one mentor.

Room 332, Convention Center

Implementing Standards-Based Curriculum in Urban Centers: Can We Sustain the Change?

Organizer/Presider

Susan Jo Russell, Education Research Collaborative, TERC

Presenters

Traci Higgins, Education Research Collaborative, TERC

Megan Murray, Education Research Collaborative, TERC

Janis Freckman, Milwaukee Public Schools, Milwaukee, Wisconsin

Susan Pfohman, Math Support Team, Portland Public Schools, Portland, Oregon

Christina Santiago, New York City Community School
District 2
Lois Womack, Milwaukee Public Schools, Milwaukee,
Wisconsin

Reactor

DeAnn Huinker, University of Wisconsin—Milwaukee
Lucy West, New York City Community School District 2

Researchers and school-based educators will examine the implementation of the *Investigations in Number, Data, and Space* curriculum in New York City, Milwaukee, and Portland, Oregon. Participants and presenters will together consider what factors are supporting or preventing sustained change.

Room 330 E/F/G, Convention Center

Construction and Interaction: Children's Fractional Schemes

Organizer/Presenter/Presenter

Leslie Steffe, University of Georgia

Organizer/Presenter

John Olive, University of Georgia

Presenters

Barry Biddlecomb, University of Georgia

Reactor

Erna Yackel, Purdue University—Calumet
Richard Lehrer, University of Wisconsin—Madison

Case studies of five children from this NSF-sponsored research project will be presented using videotaped excerpts from our three-year teaching experiment with twelve children in grades 3–5. A detailed analysis of the children's partitioning schemes and the fractional schemes they engendered will be provided, together with a discussion of the interactions that helped bring forth these schemes. Reactions will be provided from two different points of view.

Room 330 A/B/C, Convention Center

4:00 p.m.–5:15 p.m. (Closing Session)

This is a joint session with NCSM.

Program at a Glance

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7:30 p.m. (Opening Address)

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Supporting Mathematics Teachers'
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Organizer
Room 340 A/B, Convention Center

11:45 a.m.–12:45 p.m. (Brown-Bag Lunch)

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1:00 p.m.–3:30 p.m. (Concurrent Sessions)

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Room E/F/G, Convention Center

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4:00 p.m.–5:15 p.m. (Closing Session)

Adding It Up: A National Research Council Report on Mathematics Learning
Hall F5, Convention Center

Notes

Notes

support of Tuesday's reception.

Notes

Adding It Up: A National Research Council Report on Mathematics Learning

Speaker

Jeremy Kilpatrick, University of Georgia

This session will discuss the findings of a National Research Council study on helping all children learn mathematics. A committee of mathematics educators, mathematicians, psychologists, and practitioners spent 18 months reviewing research, deliberating, and formulating recommendations. The report has implications for all concerned with school mathematics.

Hall F5, Convention Center