



Program for the Research Preession

The 76th Annual Meeting of the National Council of Teachers of Mathematics

31 March–1 April 1998

**Grand Hyatt Hotel
Washington, D.C.**



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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Announcements

Informal meetings can be held on Wednesday, 8:00 a.m.–5:00 p.m., in the LaTrobe Room, Third Level, and in the Renwick and Bulfinch Rooms from 8:00 a.m. to 10:00 a.m. and 12:00 noon to 5:00 p.m.

The NCTM Research Advisory Committee is pleased to announce a “Research in Mathematics Education” Web site at www.nctm.org/committees/rac/. This Web site incorporates the information formerly found in the Research Highlights booklet.

Tuesday, 31 March 1998

7:00 p.m.–7:30 p.m.

Welcome

Organizers

Paul Cobb, Vanderbilt University
Chair, NCTM Research Advisory Committee
Douglas Owens, Ohio State University
Cochair, SIG/RME of AERA

Constitution A/B

7:30 p.m.–9:00 p.m.

Plenary Address

Critical and Social Dimensions in Equity for Mathematics Education

Presenter

Walter G. Secada, University of Wisconsin—Madison

This session will present historical evidence of how promising developments in mathematics education became barriers to the achievement of equity. It will develop the argument that without a critical stance toward reform and an understanding of the social forces that might interfere with our ability to achieve equity, the goal of “mathematics for all” will become just another slogan.

Constitution A/B

A reception will be held following the opening session.

Wednesday, 1 April 1998

8:30 a.m.–10:00 a.m.

Symposium

The Recognizing and Recording Reform in Mathematics Education Project: Insights for the Future of Standards

Organizer/Presenter

Joan Ferrini-Mundy, University of New Hampshire and
National Research Council

Presenter

Karen Graham, University of New Hampshire

We will discuss the impact of standards-based reform at various sites studied in this project, including roles that standards documents played, teachers' views of standards, and what teachers addressed in their practice. We will also examine implications for the standards movement in mathematics.

Constitution A

8:30 a.m.–10:00 a.m.

Symposium

Innovation in Mathematics Teacher Learning

Organizer/Presenter

Gwendolyn M. Lloyd, Virginia Polytechnic Institute and
State University

Presenters

Jeffrey Frykholm, Virginia Polytechnic Institute and State University
Dominic Peressini, University of Colorado at Boulder
Rebekah Elliott, University of Colorado at Boulder
Skip Wilson, University of Michigan
Edward Wall, University of Michigan
Raven Wallace, University of Michigan

Discussant

Deborah Loewenberg Ball, University of Michigan

Participants will discuss research themes associated with the development and implementation of innovative ways to facilitate mathematics teacher learning. Primary areas of focus will be teacher learning with reform-oriented curriculum materials, collegial collaboration, and hypermedia creation and exploration.

Constitution B

Wednesday, 1 April 1998

8:30 a.m.–10:00 a.m.

Symposium

**Communication in Mathematics Classrooms:
The Synergistic Nature of Teacher-Student and
Student-Student Interaction**

Organizer/Presenter

Adalira Saenz-Ludlow, University of North Carolina at
Charlotte

Presenters

Lena Licón Khisty, University of Illinois at Chicago

Verna Adams, Washington State University

Bey-Bey Li, Washington State University

Discussant

Erna Yackel, Purdue University/Calumet

These three papers, from three different research projects, explore the synergy between student-teacher and student-student interactions and its influence on elementary and middle school students' understanding of mathematics.

Constitution C

8:30 a.m.–10:00 a.m.

Work Session

**Conducting Research within a Systemic
Teacher-Enhancement Project**

Organizer/Presenter

Marilyn E. Strutchens, University of Maryland

Presenters

Patricia F. Campbell, University of Maryland

Duane A. Cooper, University of Maryland

Ann Wallace, University of Maryland

We will discuss research efforts and design issues related to the major components of a systemic teacher-enhancement project. Components include teachers' content knowledge, curriculum revision, administrative support, parental and community involvement, and documenting teacher change.

Constitution D/E

Wednesday, 1 April 1998

8:30 a.m.–10:00 a.m.

Work Session

Windows on Teaching

Organizers/Presenters

Nanette Seago, Mathematics Renaissance

Judith Mumme, WESTED

Discussants

Iris Weiss, Horizon Research, Inc.

Jim Stigler, University of California at Los Angeles

An interactive session to examine two techniques for gathering information about teaching practices—classroom observation analysis and video analysis. Preliminary results will be shared from a comparative study of classroom observation protocols from Horizon Research (Local Systemic Change Initiatives) and TIMSS Video Analysis.

Arlington/Cabin John

8:30 a.m.–10:00 a.m.

Symposium

Constructive Software: Developing Computer Environments Based on Theoretical Models

Organizer/Presenter

Douglas H. Clements, State University of New York at Buffalo

Presenters

Julie Sarama, Wayne State University

Les Steffe, University of Georgia

John Olive, University of Georgia

We describe a model for the development of software based on theory and research and four constructivist software environments built from this model.

Roosevelt/Wilson

Wednesday, 1 April 1998

10:30 a.m.–12:00 noon

Symposium

Reflecting on the Math Wars: Perspectives on the Role of Research and Researchers in the Public Discourse about Mathematics Education Reform

Organizer/Presenter

Edward A. Silver, University of Pittsburgh

Presenters

Hyman Bass, Columbia University

Judith T. Sowder, San Diego State University

Three participant-observers in the public discourse about mathematics education reform will address the general theme suggested in the title of this session, respond to each other's remarks, and engage those attending the session in a dialogue about key issues related to this theme.

Constitution A

10:30 a.m.–12:00 noon

Symposium

Standards-Oriented Elementary School Mathematics Curricula: What Does the Research Say about Student Outcomes?

Organizer/Presenter

Sharon L. Senk, Michigan State University

Presenters

Janet Beissinger, University of Illinois at Chicago

Andy Isaacs, University of Chicago School Mathematics Project

Jan Mokros, TERC

Discussants

Mary Kay Bouck, Battle Creek (Michigan) Public Schools

Denise R. Thompson, University of South Florida

Representatives of three elementary school curriculum projects will present evidence of what students who study from standards-oriented mathematics materials know and are able to do. Common themes and implications for research and practice will be discussed by a school mathematics curriculum director and a university researcher/teacher educator.

Constitution B

Wednesday, 1 April 1998

10:30 a.m.–12:00 noon

Symposium

Current Perspectives on Algebra

Organizer/Presenter

Susan J. Lamon, Marquette University

Presenters

Bill Parker, Kansas State University

James Kaput, University of Massachusetts—Dartmouth

Randolph Philipp, San Diego State University

Cornelia Tierney, TERC

Discussant

M. Kathleen Heid, Pennsylvania State University

The current status of the national debate on algebra will be examined from multiple perspectives. Theoretical and empirical work will explore the nature of algebra, issues in teacher preparation, and children's thinking under the influence of curricular and pedagogical innovations.

Constitution C

10:30 a.m.–12:00 noon

Work Session

Linking Research and Systemic Reform: A Working Group

Organizer:

Jere Confrey, University of Texas at Austin

Presenters

Eric Hamilton, National Science Foundation

Celeste Pea, National Science Foundation

Maria Santos, San Francisco Unified School District

Walter M. Stroup, University of Texas at Austin

This work session will address the need to link research and systemic reform. It will provide information on existing programs and discuss theories of systemics, challenges, obstacles in conducting research, and potential research targets.

Constitution D/E

Wednesday, 1 April 1998

10:30 a.m.–12:00 noon

Work Session

Math Recovery: An Intervention and Advancement Program for Low-Attaining First Graders and an Extensive Professional Development Program for Teachers

Organizer/Presenter

Bob Wright, Southern Cross University, Australia

Presenters

Ann Stafford, SC Educational Associates, Walhalla, South Carolina

Jim Martland, University of Liverpool, United Kingdom

This session will focus on (a) a brief overview of the Math Recovery program, (b) the application of research results and techniques in the design of the program, (c) associated research studies, (d) examples of research questions arising from the program, and (e) directions for future research.

Arlington/Cabin John

10:30 a.m.–12:00 noon

Symposium

Classroom Research on Students' Probabilistic Thinking

Organizers/Presenters

Sarah Berenson, North Carolina State University

Carolyn A. Maher, Rutgers, The State University of New Jersey—New Brunswick

Presenters

Robert Speiser, Brigham Young University

Orit Zaslavsky, Technion—Israel Institute of Technology

Discussant

Herbert P. Ginsberg, Teachers College, Columbia University

Findings from several classroom studies related to middle school students' and preservice teachers' probabilistic thinking will be shared and discussed in order to pose further questions for later work.

Roosevelt/Wilson

Program at a Glance

8:30 a.m.–10:00 a.m.

Constitution A

The Recognizing and Recording Reform in Mathematics Education Project: Insights for the Future of Standards

Joan Ferrini-Mundy

Constitution B

Innovation in Mathematics Teacher Learning

Gwendolyn M. Lloyd

Constitution C

Communication in Mathematics Classrooms: The Synergistic Nature of Teacher-Student and Student-Student Interaction

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Constructive Software: Developing Computer Environments Based on Theoretical Models

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10:30 a.m.–12:00 noon

Constitution A

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Math Recovery: An Intervention and Advancement Program for Low-Attaining First Graders and an Extensive Professional Development Program for Teachers

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Roosevelt/Wilson

Classroom Research on Students' Probabilistic Thinking

Sarah Berenson
Carolyn A. Maher

Renwick/Bulfinch

A Search for Meaningful and Valid Practices in Performance Assessment in Mathematics

Max Stephens

Program at a Glance

1:30 p.m.–3:00 p.m.

Constitution A

**Policy, Practice, and Performance—
Revisiting the California Math
Reforms**

David K. Cohen

Constitution B

**Perspectives on Classroom
Research**

David Clarke

Constitution C

**Speaking and Writing the Wor(l)d:
Two Teacher-Researchers Explore
Mathematical Classroom
Discourse**

Vicki Zack

Constitution D/E

**Examining the Functional
Dualism of Discourse in
Mathematics Classrooms**

Dominic D. Peressini

Arlington/Cabin John

**Examining Mathematics in Power
Relationships and Power in
Mathematical Relationships**

Sue Mau

Roosevelt/Wilson

**Multiplicative Thinking in Ratio,
Rate, and Function Situations**

Esther M. H. Billings

3:30 p.m.–5:00 p.m.

Constitution A

**Toward a “Research Agenda” in
Language and Mathematics in
Relation to Classrooms**

David Pimm

Constitution B

**Standards 2000: Continuing the
Research Conversation**

Members of the *Standards 2000* Project

Constitution C

**Classroom Implications of
Research on Mental Computation:
International Perspectives**

Alistair McIntosh

Constitution D/E

**Investigating the Teaching and
Learning of Developmental
Mathematics at the University
Level**

Erna Yackel

Arlington/Cabin John

**The Legacy of CGI: Moving the
Philosophy beyond Primary
School Mathematics**

Diana B. Erchick

Roosevelt/Wilson

**A Structural Analysis of Learning
Qualitative Calculus in Graphical
Environments: An Overview and
Synthesis of More than a Decade
of Research**

Walter M. Stroup

NOTE:

“Update on Federal Funding for Research in Mathematics Education”
will be held from 5:15 p.m. to 6:30 p.m. in Constitution B.

Wednesday, 1 April 1998

10:30 a.m.–12:00 noon

Symposium

A Search for Meaningful and Valid Practices in Performance Assessment in Mathematics

Organizer/Presenter

Max Stephens, Victoria Board of Studies, Australia

Presenters

Cathy Beesey, Australian Catholic University

Norman Webb, University of Wisconsin—Madison

Susan P. Lajoie, McGill University

Discussant

Tom Romberg, University of Wisconsin—Madison

The symposium will report on studies of performance assessment in three countries. It will focus on the quality and consistency of teachers' judgments and on theoretical and practical issues relating to the aggregation of information derived from performance assessments.

Renwick/Bulfinch

1:30 p.m.–3:00 p.m.

Thematic Presentation

**Policy, Practice, and Performance—
Revisiting the California Math Reforms**

Organizer/Presider

Jim Stigler, University of California at Los Angeles

Presenter

David K. Cohen, University of Michigan

This paper discusses the mathematics reforms in California on the basis of a 1994 survey of California teachers. Teachers who had the usual opportunities to learn about improved mathematics teaching reported conventional teaching. But a minority of teachers studied new curriculum designed for the reforms, or students' work on revised assessments. Their practice was significantly closer to the aims of the policy, and their students had higher math scores.

Constitution A

Wednesday, 1 April 1998

1:30 p.m.–3:00 p.m.

Symposium

Perspectives on Classroom Research

Organizer/Presenter

David Clarke, University of Melbourne, Australia

Presenters

Deborah Loewenberg Ball, University of Michigan

Koeno Gravemeijer, University of Utrecht, Netherlands

Alan Schoenfeld, University of California at Berkeley

Discussant

James Greeno, Institute for Research on Learning and
Stanford University

A variety of methods are currently being employed internationally for the investigation of the practices and outcomes of mathematics classrooms and for the improvement of those practices and outcomes. This session will outline how four researchers have met the challenges of classroom research in addressing their distinct research agendas.

Constitution B

1:30 p.m.–3:00 p.m.

Symposium

**Speaking and Writing the Wor(l)d: Two
Teacher-Researchers Explore Mathematical
Classroom Discourse**

Organizer/Presenter

Vicki Zack, Saint George's School, Montreal, Quebec, and
McGill University

Presenters

Roberta Schorr, Rutgers, The State University of New Jersey—
Newark

Eileen Phillips, Kerrisdale Elementary School, Vancouver,
British Columbia

Discussants

Carolyn Maher, Rutgers, The State University of New Jersey—
New Brunswick

David Pimm, Michigan State University

Eileen Phillips and Vicki Zack, teacher-researchers, will report on ongoing research connected with written and spoken mathematical discourse, with a focus on the high-level similarities and differences between speech and writing in the teaching and learning of mathematics.

Constitution C

Wednesday, 1 April 1998

1:30 p.m.–3:00 p.m.

Work Session

Examining the Functional Dualism of Discourse in Mathematics Classrooms

Organizer/Presenter

Dominic D. Peressini, University of Colorado at Boulder

Presenter

Eric Knuth, University of Colorado at Boulder

A conceptual framework built around the *functional dualism* of discourse will be introduced, and participants—using this framework—will analyze the discourse that occurred in a yearlong professional development program for secondary school teachers and in a high school mathematics class.

Constitution D/E

1:30 p.m.–3:00 p.m.

Thematic Presentation

Examining Mathematics in Power Relationships and Power in Mathematical Relationships

Organizer/Presenter

Sue Mau, Indiana University–Purdue University Indianapolis

Presenters

Ann Leitze, Ball State University

Anne M. Raymond, Keene State College

Beatriz D'Ambrosio, Indiana University–Purdue University Indianapolis

This session examines the interaction of mathematical power and power relationships in mathematics classrooms from the perspective that power is both being able to participate competently and actually participating competently in mathematics.

Arlington/Cabin John

Wednesday, 1 April 1998

1:30 p.m.–3:00 p.m.

Symposium

Multiplicative Thinking in Ratio, Rate, and Function Situations

Organizer/Presenter

Esther M. H. Billings, Northern Illinois University

Presenters

Jason Thrun, Northern Illinois University

Ellen Hines, Northern Illinois University

David B. Klanderma, Trinity Christian College

Discussant

Helen A. Khoury, Northern Illinois University

Four related studies will explore different aspects of students' multiplicative thinking in ratio, rate, and function situations. Students' constructions and coordination of units during problem solving will be analyzed, and implications related to students' algebraic thinking will be discussed.

Roosevelt/Wilson

3:30 p.m.–5:00 p.m.

Symposium

Toward a "Research Agenda" in Language and Mathematics in Relation to Classrooms

Organizer/Presider

Paul Cobb, Vanderbilt University

Presenter

David Pimm, Michigan State University

For the past twenty years I have worked in and around an area loosely framed by the conjunction "language and mathematics." I am beginning to develop a sense for some seemingly invariant issues and dilemmas about mathematical communication and other functions of language in the service of mathematics—its very expression as well as its teaching and learning—which I propose to offer for discussion.

Constitution A

Wednesday, 1 April 1998

3:30 p.m.–5:00 p.m.

Work Session

Standards 2000: Continuing the Research Conversation

Organizers

Mary Lindquist, Columbus State University
Joan Ferrini-Mundy, University of New Hampshire and
National Research Council

Presenters

Members of the *Standards 2000* Writing Group and the
Commission on the Future of the *Standards*

This session will provide an update on research-related initiatives in the *Standards 2000* project and an opportunity for the research community to have a continuing voice and opportunity for input into the effort. Visit www.nctm.org/Standards2000 for discussion questions.

Constitution B

3:30 p.m.–5:00 p.m.

Symposium

Classroom Implications of Research on Mental Computation: International Perspectives

Organizer/Presenter

Alistair McIntosh, Edith Cowan University, Australia

Presenters

Eddie Gray, University of Warwick, United Kingdom
Demetra Pitta, University of Warwick, United Kingdom
Robert Reys, University of Missouri—Columbia
Len Sparrow, Edith Cowan University, Australia

Discussant

Paul R. Trafton, University of Northern Iowa

The session highlights three research studies from Australia, England, and the United States on the mental computation of elementary school children, which have differing, and sometimes conflicting, implications for the elementary school classroom.

Constitution C

Wednesday, 1 April 1998

3:30 p.m.–5:00 p.m.

Work Session

**Investigating the Teaching and Learning
of Developmental Mathematics at the
University Level**

Organizer/Presenter

Erna Yackel, Purdue University/Calumet

Presenters

Elena Steencken, Rutgers, The State University of New Jersey—
New Brunswick

Mercedes McGowen, William Rainey Harper College

Diana Underwood Gregg, Purdue University/Calumet

The session will involve participants in identifying the role that mathematics education research can play in developmental mathematics at the university level. A panel of mathematics educators will open the session by discussing the issues that they are currently investigating.

Constitution D/E

3:30 p.m.–5:00 p.m.

Symposium

**The Legacy of CGI: Moving the Philosophy
beyond Primary School Mathematics**

Organizer/Presenter

Diana B. Erchick, Ohio State University

Presenters

Patti Brosnan, Ohio State University

Sybil Brown, Ohio State University

Richard P. Connelly, Ohio State University

Ferdinand Rivera, Ohio State University

Discussant

Suzanne K. Damarin, Ohio State University

Five presenters discuss implications and issues for mathematics content and pedagogy that emerged from their research on efforts to expand Cognitively Guided Instruction (CGI) into the teaching and learning of mathematics in grades 4–16.

Arlington/Cabin John

Wednesday, 1 April 1998

3:30 p.m.–5:00 p.m.

Thematic Presentation

**A Structural Analysis of Learning Qualitative
Calculus in Graphical Environments:
An Overview and Synthesis of More than a
Decade of Research**

Organizer/Presenter

Walter M. Stroup, University of Texas at Austin

Discussants

Jere Confrey, University of Texas at Austin

Ricardo Nemirovsky, TERC

Patrick W. Thompson, Vanderbilt University

Updating Piaget's idea of *qualitative rate*, a notion of *qualitative calculus* will be introduced and used to synthesize more than a decade of calculus-related research and innovation in computer-based graphing and simulation environments.

Roosevelt/Wilson

5:15 p.m.–6:30 p.m.

Information Session

**Update on Federal Funding for Research in
Mathematics Education**

Presenter

Erna Yackel, Purdue University/Calumet

Presenters

Nora Sabelli, National Science Foundation

Pat O'Connell Ross, U.S. Department of Education,

Dwight D. Eisenhower Professional Development Program

Carol Lyons, U.S. Department of Education,

Office of Educational Research and Improvement

Constitution B

