



Program for the Research Preession

The 77th Annual Meeting of the National Council of Teachers of Mathematics

19–21 April 1999

**Moscone Center
San Francisco, California**



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

NCTM Research Advisory Committee

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Announcements

Informal meetings can be held on Tuesday in Room 132, 9:00 a.m.–5:00 p.m., and Wednesday in Rooms 228 & 230, 1:00 p.m.–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.

The Call for Papers for the next Research Pre-session, to be held in Chicago, Illinois, in April 2000, will be available at the registration table.

Monday, 19 April 1999

7:00 p.m.–7:30 p.m.

Welcome

Organizers

Deborah Schifter, Education Development Center
Chair, NCTM Research Advisory Committee

Carolyn Maher, Rutgers, State University of New Jersey—
New Brunswick
Cochair, SIG/RME of AERA

120–121 & 123–124

7:30 p.m.–8:30 p.m.

Plenary Address

Research and Assessment Issues in the Teaching and Learning of Probability and Statistics: What Questions Might We Be Asking?

Presenter

Mike Shaughnessy, Portland State University

120–121 & 123–124

8:30 p.m.

Reception

A reception will be held following the opening session.

130–131

Tuesday, 20 April 1999

9:00 a.m.–10:30 a.m.

**Research on Mathematics Teacher Development
in the Context of Reform: What Have We Learned
to Pay Attention to in Teachers' Practice?**

Organizer/Participant

Martin A. Simon, Pennsylvania State University

Participants

Randolph A. Philipp, San Diego State University

Deborah Schifter, Education Development Center

Research on mathematics teacher development depends on the researchers' ability to focus on key aspects of teachers' practice and thinking about practice. This work session will promote discussion of important foci for such research.

220 & 222

9:00 a.m.–10:30 a.m.

**Standards-Based NSF Middle Grades
Mathematics Curricula: What Does Research
Say about Their Impact on Students?**

Organizer/Presider

Robert Reys, University of Missouri

Presenters

Susan N. Friel, University of North Carolina at Chapel Hill

Richard Lapan, University of Missouri

Mary Shafer, University of Wisconsin—Madison

John (Jack) P. Smith III, Michigan State University

Research studies documenting the impact of NSF-sponsored *Standards*-based middle school mathematics curricula on student learning will be shared. In addition, participants and the audience will engage in a broader discussion of researchable questions and their implications for future directions for research in this area.

236 & 238

Tuesday, 20 April 1999

9:00 a.m.–10:30 a.m.

Teachers' Inquiry into Mathematics, Learning, and Discourse: Implications for Teacher Professional Development

Organizers/Presenters

Steve Monk, TERC and University of Washington
Judith Moschkovich, TERC

Presenter

Tracey Wright, TERC

This session will serve as an introduction to the teacher professional development work of the Chéche Konnen Center at TERC. After a brief description of the Chéche Konnen teacher seminars, participants will spend an hour in small groups analyzing and discussing a video clip from a teacher seminar on the mathematics of motion, followed by a short discussion of the implications of this type of inquiry for teacher professional development.

228 & 230

9:00 a.m.–10:30 a.m.

New Ways to Share Mathematics Education Research

Organizers/Presenters

Douglas H. Clements, State University of New York at Buffalo
Francis (Skip) Fennell, National Science Foundation and
Western Maryland College

Presenters

Richard T. Lesh, Purdue University
Judith T. Sowder, San Diego State University
Les Steffe, University of Georgia

Discussant

Frank T. Lester, Jr., Indiana University

In an era of mathematics education debate and change, accompanied by increasing avenues for (electronic) communication, it is necessary to ask if there are new ways to disseminate and discuss research. We will raise such issues and discuss various perspectives, inviting full audience participation.

224 & 226

Tuesday, 20 April 1999

9:00 a.m.–10:30 a.m.

**Learning to Teach Secondary School
Mathematics: Conceptualizing and Assessing
Content Knowledge**

Organizer/Presenter

Low Romagnano, Metropolitan State College of Denver

Presenters

Hilda Borko, Jeffrey Hovermill, Dominic Peressini, and
Candace Wooley, University of Colorado at Boulder

Discussant

Catherine Brown, Indiana University

What pictures do researchers build of prospective secondary school teachers' developing content knowledge when observed in different contexts? Participants in this work-session will consider this question using one project's conceptual framework and data from content courses, methods courses, and field experiences.

232 & 234

11:00 a.m.–12:30 p.m.

**Do You See What I See? Developing the Power
of Observation in Preservice Mathematics
Teachers**

Organizer/Presenter

Denise S. Mewborn, University of Georgia

Presenter

Patricia S. Wilson, University of Georgia

Discussant

Randolph A. Philipp, San Diego State University

This session will present data from four studies (two secondary and two elementary) to examine the development of observation in preservice teachers and the relationship of observation to insight and reflection.

220 & 222

Tuesday, 20 April 1999

11:00 a.m.–12:30 p.m.

There's More to Life than Centers! Students' Conceptions of Variability

Organizer/Presenter

Mike Shaughnessy, Portland State University, Portland, Oregon

Presenters

Cliff Konold, University of Massachusetts

Melissa Mellissinos, San Diego State University

Reactor/Discussant

Graham Jones, Illinois State University

Students have difficulty making valid statistical statements, perhaps because they need to accept inherent variability in statistical data and thus see medians or means as signals in the midst of noise. We will look at research on conceptions of variability through three different lenses: secondary school students' decisions when making comparisons; college students' notions of distribution; and elementary school students' responses on a NAEP sampling item.

236 & 238

11:00 a.m.–12:30 p.m.

Change in the Teaching and Learning of College Mathematics

Organizer/Presenter

Chris Rasmussen, Purdue University Calumet

Presenters

Karen King, San Diego State University

Amy Roth-McDuffie, Washington State University, Tricities

Erna Yackel, Purdue University Calumet

Discussant

James T. Fey, University of Maryland

In this symposium we examine issues related to effective reform at the college level including institutional norms, classroom norms, symbolizing, and instructional use of technology. The analyses presented in these papers begin to point to how university level mathematics instruction might be conducted so that students develop sophisticated, conceptual mathematical understandings.

224 & 226

Tuesday, 20 April 1999

11:00 a.m.–12:30 p.m.

**Researching the Teaching and Learning of
Number in English Elementary Schools: The
Leverhulme Numeracy Research Programme**

Organizer/Presider/Presenter

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

Presenters

Mike Askew, Margaret L. Brown, Alison Millett, Hazel Denvir,
and Valerie Rhodes, King's College, University of London

Discussants

Maryl Gearhart, University of California at Berkeley
Carolyn A. Maher, Rutgers, State University of New Jersey—
New Brunswick

The Leverhulme Trust has funded the largest research program in elementary school mathematics in England. The (longitudinal) program is designed to further our understanding of the effect of current and developing practices in the teaching and learning of number.

228 & 230

11:00 a.m.–12:30 p.m.

**New Age ZPD: Learning Mathematics Using
Mediating Technology**

Organizer/Presenter

Jeffrey P. Smith, Ohio State University

Presenters

Michael Bumbaugh, Ohio State University
Todd Edwards, Upper Arlington High School, Upper Arlington,
Ohio
S. Asli Ozgun-Koca, ERIC Clearinghouse, Columbus, Ohio

Reactants

Suzanne Damarin, Ohio State University
Bert Waits, Ohio State University

Findings from three studies provide new insights into students' construction of knowledge when the power of technology is at hand. When woven together, these reports build a theory of learning that extends the work of Vygotsky and Papert.

232 & 234

Tuesday, 20 April 1999

2:00 p.m.–4:30 p.m.

A Research Perspective on the Discussion Draft of *Principles and Standards for School Mathematics*

Organizer/Presider

W. Gary Martin, National Council of Teachers of Mathematics

Presenters

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

Jeremy Kilpatrick, University of Georgia

Mary M. Lindquist, Columbus State University, Columbus,
Georgia

Discussants

Ed Esty, SRI International and U.S. Department of Education

Tom Romberg, University of Wisconsin—Madison

An overview of how research was used in producing the *PSSM* Discussion Draft will be provided. Participants will be invited to give their input on how research could be more effectively incorporated into the final version. See discussion questions at www.nctm.org/standards2000.

236 & 238

2:00 p.m.–4:30 p.m.

Current Perspectives on the Teaching and Learning of Geometry in a Dynamic Environment

Organizer

Barbara Pence, San Jose State University

Presenters

Richard Allen, Saint Olaf College, Northfield, Minnesota

Paul Goldenberg, Education Development Center

Colette Laborde, Laboratoire LEIBNIZ, Institut IMAG,
Grenoble, France

Reactor

Jean-Marie Laborde, Laboratoire LEIBNIZ, Institut IMAG,
Grenoble, France

This session will examine the current status of geometry from multiple perspectives. Assuming curricular and pedagogical innovations including Dynamic Geometry, it will investigate theoretical and empirical work on the nature of geometry, issues of teacher preparation, and critical dimensions of student thinking.

232 & 234

Tuesday, 20 April 1999

2:00 p.m.–4:30 p.m.

Tracing the Growth of Mathematical Understanding

Organizer

Robert Speiser, Brigham Young University

Presenters/Discussion Leaders

Carolyn A. Maher and Elena Steencken, Rutgers, State University of New Jersey—New Brunswick

Mercedes McGowen, William Rainey Harper College, Palatine, Illinois

We focus on studying the development of mathematical ideas over time. We examine three recent studies, which feature novel maps and codes, and invite the audience to join us in an analysis and discussion of actual research data, from multiple perspectives. A common “longitudinal style” emerges, applicable to short as well as long time scales.

220 & 222

2:00 p.m.–4:30 p.m.

Toward Research and Theory in Systemwide Teacher Enhancement Projects: Perspectives, Issues, and Strategies for Investigations in Reform Partnerships

Organizer/Presenter

Larry L. Hatfield, University of Georgia

Presenters

Patricia F. Campbell and Marilyn E. Strutchens, University of Maryland

John Olive, University of Georgia

We will discuss basic perspectives, issues, and strategies for research within and about systemwide teacher enhancement efforts. Papers will be provided, summarized, and discussed. Participants will address fundamental questions in round-table groups and plenary interactions.

224 & 226

Wednesday, 21 April 1999

5:00 p.m.

A reception honoring graduate students

236 & 238

9:00 a.m.–10:30 a.m.

**Teaching and Learning School Mathematics by
Building on Students' Out-of-School
Mathematics Practice: Is This Realistic?**

Organizer/Presider/Presenter

Joanna O. Masingila, Syracuse University

Presenters

Rapti de Silva, Syracuse University

Nancy A. Sellmeyer, Jamesville-Dewitt Middle School,
Jamesville, New York

We will present our work of the last four years of an NSF-sponsored project involving connecting in-school and out-of-school mathematics practice and then invite all present to join us in discussing the realities and implications of this attempt at making connections.

232 & 234

Wednesday, 21 April 1999

9:00 a.m.–10:30 a.m.

The Transformation of Activity: Toward a Theory of Mathematical Notating and Knowing

Organizer/Presenter

Laura Brinker, University of South Carolina

Presenters

Rebecca Ambrose, Jae-Meen Baek, and Margie Pligge,
University of Wisconsin—Madison

Presider/Presenter

Susan B. Empson, University of Texas at Austin

Discussant

Constance Kamii, University of Alabama at Birmingham

This session will examine the role of representations in students' thinking within several domains. Specifically, classroom-based examples will be used to highlight the kinds of thinking practices that may or may not be supported by both conventional and invented notations.

228 & 230

9:00 a.m.–10:30 a.m.

Teachers as Teachers and Researchers as Researchers: An Example of Intertwined Learning

Organizer/Presenter

Virginia Bastable, Mount Holyoke College

Presenters

Rebecca Eston, Lincoln School, Lincoln, Massachusetts
Deborah O'Brien, Mosier Elementary School, South Hadley,
Massachusetts

Discussant/Reactant

Steve Monk, TERC and University of Washington

This interactive session will explore what it is that teachers and researchers can learn from one another as they work on a collaborative project to produce teacher-written narratives detailing the mathematical thinking of their students.

220 & 222

Wednesday, 21 April 1999

9:00 a.m.–10:30 a.m.

Standards-Based Reform: Issues and Lessons Learned

Organizer/Presenter

Harold L. Schoen, University of Iowa

Presenters

Arthur F. Coxford, University of Michigan

James T. Fey, University of Maryland

Eric W. Hart, Maharishi University of Management, Fairfield,
Iowa

Christian R. Hirsch, Western Michigan University

Reactor

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

Key issues from NCTM's *Curriculum and Evaluation Standards* will be examined in light of both the experience of the Core-Plus Mathematics Project, an NSF-funded high school curriculum designed to implement those *Standards*, and relevant recommendations in the draft of *Principles and Standards for School Mathematics*.

236 & 238

Wednesday, 21 April 1999

9:00 a.m.–10:30 a.m.

Assessing and Using Students' Statistical Thinking to Inform Instruction

Organizer

Graham A. Jones, Illinois State University

Presenters

Cynthia W. Langrall, Illinois State University

Ed Mooney, Illinois State University

Bob Perry, University of Western Sydney, Macarthur

Ian J. Putt, James Cook University

Carol A. Thornton, Illinois State University

Reactors

Frances R. Curcio, New York University

Lyn D. English, Queensland University of Technology

The session reports on a three-year program of research in both the United States and Australia on statistical thinking of students in the elementary and middle grades. It examines both the validation of a framework to assess and describe students' statistical thinking and the use of this research-based framework to inform instruction in data handling.

224 & 226

11:00 a.m.–12:30 p.m.

Parents as Mathematics Learners: Shifting the Focus of Engagement

Organizers/Presenters

Amy Morse, Education Development Center

Liz Sweeney, Boston Public Schools

This session is designed to raise issues of parental involvement in mathematics education and the ways educational communities might more purposefully and deeply engage parents in mathematics learning. We will work from a selection of writings by parent participants in an elementary school-based seminar in mathematical thinking.

232 & 234

Wednesday, 21 April 1999

11:00 a.m.–12:30 p.m.

Implementing Change in the Teaching and Learning of Calculus: Clarifying the Issues

Organizers/Presenters

Karen Graham, University of New Hampshire
Darien Lauten, Rivier College, Nashua, New Hampshire

Presenters

Steve Benson, University of Wisconsin—Oshkosh
Hope Gerson, University of New Hampshire
Timothy Gutmann, University of New Hampshire

Presider

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

Discussants

M. Kathleen Heid, Pennsylvania State University
Deborah Hughes-Hallett, Harvard University

This symposium will address how different data sources can be used to gain insights into themes, issues, and questions surrounding the implementation of change in the teaching and learning of calculus.

224 & 226

11:00 a.m.–12:30 p.m.

The Teacher-Curriculum Partnership: What Does It Look Like in Practice?

Organizer/Presenter

Susan Jo Russell, TERC

Presenters

Katie Bloomfield, Shutesbury Elementary School, Shutesbury,
Massachusetts
Nancy Horowitz, Springfield, Massachusetts, Public Schools

This session will involve participants in considering the question, How do you “revise” a “good” curriculum to fit the individuality of a particular class while preserving mathematical coherence and rigor?

220 & 222

Wednesday, 21 April 1999

11:00 a.m.–12:30 p.m.

“I Wanted to Move the Alien Backwards, So I Changed His Position on the Graph!” and Other Lessons Learned from Seventh Graders Using Technology

Organizer/Presider/Presenter

Janet Bowers, San Diego State University

Presenters

Susan Nickerson, San Diego State University

Cherie Nydam, Emerald Middle School, El Cajon, California

Discussant

Jim Kaput, University of Massachusetts—Dartmouth

The presenters in this symposium will describe lessons learned from a three-week teaching experiment that involved an extensive use of technology to introduce seventh graders to the mathematics of change and variation.

228 & 230

11:00 a.m.–12:30 p.m.

Joint Education Research Initiative of the National Science Foundation and the Department of Education

Organizers/Presenters

Nora Sabelli, National Science Foundation

Eric Hamilton, National Science Foundation

Richard Venezky, Department of Education

This work session will summarize the process that led to the formulation of the Education Research Initiative (ERI), jointly sponsored by NSF and the Department of Education. It will solicit interactions to expand and deepen the conceptual framework of the initiative to guide a long-term national research program.

236 & 238

Wednesday, 21 April 1999

2:00 p.m.—4:30 p.m.

***Principles and Standards for School Mathematics*
in Electronic Format: The Possibilities and
What We Are Learning from Users**

Organizer/Presider/Presenter

Enrique Galindo, Indiana University

Presenters

Kathryn Essex, Indiana University

Heréndira Galindo, Indiana University

Rebecca McGraw, Indiana University

Discussant

Jim Kaput, University of Massachusetts—Dartmouth

Ricardo Nemirovsky, TERC

A technology-rich format of *Principles and Standards for School Mathematics* has the potential to make the document even more useful, help teachers better understand the Standards, and promote discussion and reflection about how they might be implemented. Preliminary results from usability testing will be discussed. Participants will be invited to provide input on the electronic examples and other features of the electronic version.

236 & 238

2:00 p.m.—4:30 p.m.

***Beyond the Ivory Tower: The Politicization of
Mathematics Education Research***

Organizers/Presiders

Brian Greer, Queen's University, Belfast, Northern Ireland

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

Speakers

Ubi D'Ambrosio, University of São Paulo

Bill Jacob, University of California at Santa Barbara

W. Gary Martin, National Council of Teachers of Mathematics

The papers will discuss some of the political issues facing mathematics education—globally, nationally, and in California—focusing on the responsibilities of researchers and how their effectiveness in ideological debate with policymakers and other interest groups might be increased.

232 & 234

Program at a Glance

Monday, 19 April 1999

Moscone Center, Exhibit Hall Level

7:00 p.m.

Welcome

120-121 & 123-124

7:30 p.m.

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Mike Shaughnessy, Presenter

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130-131

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Electronic Networks: A Tool for Professional Development?

Naomi Hupert, Organizer

224 & 226

Perspectives on the Last Century in Mathematics Education and the Roles of Mathematicians

Duane A. Cooper, Organizer

220 & 222

Registration Information

A nominal \$20 registration fee will be charged; students may register at no charge. To preregister, see the registration form in the 77th Annual Meeting conference preview brochure. Registration will also be accepted at the door. You do not need to be an NCTM member to attend the conference, and you may preregister for the Research Pre-session even if you are not attending the Annual Meeting.

