Program for the Research Presession

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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Education Development Center  
NCTM Headquarters

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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 Preession, 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

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

8:30 p.m.
**Reception**

A reception will be held following the opening session.
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
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  
Judit 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

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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
9:00 a.m.–10:30 a.m.

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

*Organizer/Presenter*
Lew 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.

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.
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.

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.
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.

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.
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.

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.
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

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 roundtable groups and plenary interactions.

224 & 226
5:00 p.m.
A reception honoring graduate students

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.
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
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
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.

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.
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-Hallet, 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
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.

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.
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 Paolo
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**

### 7:30 p.m.
**Plenary Address: Research and Assessment Issues in the Teaching and Learning of Probability and Statistics: What Questions Might We Be Asking?**
Mike Shaughnessy, Presenter

### 8:30 p.m.
**Reception**

## Tuesday, 20 April 1999
Moscone Center, East Mezzanine Level

### 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?**
Martin A. Simon, Organizer

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

**Teachers’ Inquiry into Mathematics, Learning, and Discourse: Implications for Teacher Professional Development**
Steve Monk and Judit Moschkovich, Organizers

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Larry L. Hatfield, Organizer

### 5:00 p.m.
**Reception honoring graduate students**
<table>
<thead>
<tr>
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</tr>
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<tbody>
<tr>
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<td>Naomi Hupert, Organizer</td>
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<td>Perspectives on the Last Century in Mathematics Education and the Roles of Mathematicians</td>
<td>Duane A. Cooper, Organizer</td>
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<tr>
<td>Registration Information</td>
<td>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 Presession even if you are not attending the Annual Meeting.</td>
<td>220 &amp; 222</td>
</tr>
</tbody>
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