

**PME-NA Schedule and Program  
October 21 - 24, 2004**

**Thursday, October 21, 2004**

**4:00 – 7:00 p.m.**

Registration

**Churchill Court**

**7:00 - 8:45 p.m.**

Conference Opening

**Churchill Ballroom**

**Plenary Session:**

Mathematics: The Noetic and the Aesthetic

Nathalie Sinclair, Michigan State University,

David Pimm, University of Alberta,

William Higginson, Queen's University

**8:45 - 9:30 p.m.**

Reception

**Churchill Ballroom**

**9:30 – 10:30 p.m.**

Graduate Students "Gathering"

**Friday, October 22, 2004**

**7:30 – 8:45 am**

Breakfast

**Churchill Ballroom**

**9:00 - 11:00 a.m.**

Working/Discussion Groups

**Working Groups**

Complexity of Learning to Reason Probabilistically

James Tarr, Hollylynne Stohl

Windsor

Gender and Mathematics: Moving Toward New Spaces

Diana Erchick, Peter Applebaum, Joanne Rossi Becker, Suzanne Damarin

Stevenson

Geometry and Technology

Keith Leatham, Jean McGehee

Scott A

Knowledge of Algebra for Teaching

Gail Burrill, Joan Ferrini Mundy, Sharon Senk, Dan Chazan

Rossetti B

Learning and Teaching with Proof

Despina Stylianou, Maria Blanton

Carlyle A

Mathematics Teaching Assistant Preparation and Development Research

Natasha Speer, Timothy Gutmann, Teri Murphy

Scott B

Models & Modeling

Richard Lesh, Guadalupe Carmona, Thomas Post

Baker

## Discussion Group

Exploring the Use of Clinical Interviews in Teacher Development  
Rebecca Ambrose, Cynthia Nicol, Sandra Crespo, Vicki Jacobs, Patricia Moyer, Hanna Haydar

Rossetti C

### 11:00 - 11:20 a.m.

Break

### 11:20 a.m.-12:00 p.m.

## Research Reports- Session 1

---

	<b>Page</b>	<b>Room</b>
Approximation as a Foundation for Understanding Limit Concepts Michael Oehrtman	1-95	Scott A
Disparities in Numeracy Learning for Five-to Eleven-Year-Olds in New Zealand Jennifer Young-Loveridge	2-705	Wren C
One Teacher, Two Curricula: How and Why Does Her Pedagogy Vary? Beth Herbel-Eisenmann, Sarah Theule Lubienski, Lateefah Id-Deen	2-901	Rossetti B
Developing Mathematical Justification: The Case of Prospective Elementary School Teachers Jane-Jane Lo, Terry Grant, Judith Flowers	3-1159	Whistler
Examining the Teacher's Modes of Participation Within a Community of Inquiry Azita Manouchehri	3-1307	Rossetti A
Guiding the Mathematics of Mathematical Discussions Megan Staples	3-1311	James
Using Design Research to Support the Learning of a Professional Teaching Community of Middle-School Mathematics Teachers Qing Zhao, Jana Visnovska, Kay McClain	3-969	Scott B
Building a Mathematics Education Community that Facilitates Teacher Sharing in an Urban Elementary School Dorothy Y. White, Paola Sztajn, Amy Hackenberg, Martha Allexsaht-Snider	3-977	Stevenson
Teacher Learning in Lesson Study: Developing Professional Capacity and Resources Aki Murata, Catherine Lewis, Rebecca Perry	3-985	Rossetti C
From Primitive Knowing to Formalising: The Role of Student-to-Student Questioning in the Development of Mathematical Understanding Lisa Warner, Roberta Schorr	2-429	Baker
On the Limit Concept in a Cooperative Learning Environment: A Case Study Rosa Paez, Fernando Hitt	1-103	Carlyle A
Strategies Used by First Grade of Secondary School Students When Solving Word Problems of Unequal Sharing Julio Arteaga, José Guzman Hernandez	1-209	Carlyle B
Improving Problem-Solving Journals: The Mathematician, the Narrator, and the Participant Peter Liljedahl	2-439	Duchesse

	<b>Page</b>	<b>Room</b>
Promoting Students' Comprehension of Definite Integral and Area Concepts Through the Use of Derive Software Matias Camacho, Ramón Depool, Manuel Santos-Trigo	2-447	Windsor
A Taxonomy of Generative Activity Design Supported by Next-Generation Classroom Networks Walter Stroup, Nancy Ares, Andrew Hurford	3-1401	Wren B
"A Fourth is a Half of a Half": Children's Use of Relationships to Compare Fractions Melanie Wenrick	2-529	Wren A
Reasoning Strategies in the Solution of Geometric Problems Through Cabri Géomètre Ivonne Sandoval	2-555	Turner
Patterns of Motivation and Beliefs Among Before-Precalculus College Mathematics Learners Pete Johnson	2-713	Austin

## **Plenary Follow-up Session**

Mathematics: The Noetic and the Aesthetic Nathalie Sinclair, Michigan State University, David Pimm, University of Alberta, William Higginson, Queen's University	<b>Churchill Court</b>
---	------------------------

### **12:00 - 12:45 p.m.** **Lunch**

**Churchill Ballroom**

#### **Graduate Lunch**

a Mathematics Education Position in Higher Education: Considerations and Recommendations  
James Tarr

Windsor

### **1:00 - 2:30 p.m.**

Plenary Session:  
Experimental teaching as a way of building bridges  
Robert Speiser, Brigham Young University

**Churchill Ballroom**

### **2:30 - 3:10 p.m.**

## **Research Reports - Session 2**

---

Student Understanding of Generality Eric Knuth, Jamie Sutherland	2-561	Baker
Conceptions of Proof Among Preservice High School Mathematics Teachers Stéphane Cyr	2-569	Windsor
Pre-service Teachers Experiencing Mathematics Through Moon Projects and Spinning Tops Jennifer Wilhelm, Sandi Cooper, Sally McMillan	3-116	Scott A
A Work in Progress: The Challenges of Change in Secondary Mathematics Teaching Helen Doerr, Karen King	3-1319	Wren C
Comparative Analysis of Conceptual Understanding of Calculus Ideas Among Teachers with Different Calculus Experience Mourat Tchoshanov, Sally Blake, Karla Huereca, Antonio Borunda	3-1329	Rossetti A
Schisms, Breaks, and Islands - Seeking Bridges Over Troubled Waters: A Subjective View From Germany Guenter Toerner, Klaus Hochsmann	3-993	Austin

	<b>Page</b>	<b>Room</b>
Strengthening Inservice Secondary Mathematics Teachers' Understanding and Strategies in Mathematical Problem Solving James Epperson	3-1003	Carlyle A
Teaching Efficacy and Attributions for Student Failure Mary Pat Sjostrom	2-909	Carlyle B
Learning to Teach Preservice Mathematics Teachers: The Role of a Doctoral Course Sandra Crespo, Natasha Speer	3-1011	Duchesse
Helping Preservice Elementary Teachers Develop Flexibility in Using Word Problems in Their Teaching Olive Chapman	3-1175	Rossetti C
Individual Gain and Engagement with Teaching Goals Gary Davis, Mercedes McGowen	1-333	Rossetti B
A First-Order Differential Equations Schema John Donovan	1-111	Turner
Introduction of 'Flexibility' of Mathematical Conceptions as a Learning Goal Mette Andresen	1-119	Wren B
Related Rates Problems: Identifying Conceptual Barriers Nicole Engelke	2-455	Wren A
Motivating Statistical Reasoning: Comparing Equal and Unequal-Size Groups Kay McClain, Susan Friel	1-397	Stevenson
Dynamic Visual and Situated Computer Activities Design for Learning Linear Function Chen-Jen Hsieh, Shou-Hua Lin	3-1411	James
Extending and Refining Models for Thinking About Division of Fractions Sylvia Bulgar, Roberta Schorr, Lisa Warner	2-537	Scott B
Prospective Secondary Mathematics Teachers' Conceptions of Proof and its Logical Underpinnings Kate Riley	2-729	Whistler

### **3:10 - 3:30 p.m.**

Break

### **3:30 - 4:10 p.m.**

#### **Short Oral Reports- Session 1**

#### **Problem Solving**

Research and Practice at University Level: The Improper Integral Alejandro Gonzalez-Martin, Matias Camacho	1-186	Rossetti B
Solving and Solution: The Interplay of Multiple Discourses of Mathematics Jered Wasburn-Moses		
Is There "Continuity" Between the Mathematical Activities Practiced by Mathematicians and the Ones Performed in Informal Contexts? Mirela Rigo, Olimpia Figueras	2-855	

#### **Elementary Pre-service**

Preservice Elementary Teachers' Conceptions of Multidigit Whole Numbers: Why Is Understanding Regrouping So Difficult? Eva Thanheiser	3-1265	Windsor
--	--------	---------

	<b>Page</b>	<b>Room</b>
The Burden of Mathematics Timothy Gutmann	2-879	Windsor
The Spirit of Four: A Case Study of Metaphors and Models of Number Construction Maria Droujkova	3-1521	
<b>Teacher Beliefs</b>		
The Importance of Beliefs in Driving Teacher Practice Louis Lim	2-948	Carlyle A
Mathematics Teachers' Perceptions of Their Change: An Inquiry Through Psychological Type Preference Lenses Bulent Cetinkaya, Joanna Masingila	3-1125	
The Other Side of "Teaching As One Was Taught:" A Case of a Student From Reform-Oriented Schooling Implementing Traditional Instructional Practices Natasha Speer	3-1127	
<b>Elementary Mathematics</b>		
Using Standards-Based Mathematics Curricula to Better Prepare Elementary School Mathematics Teachers Andrea Lachance	3-1269	Scott B
Elementary Teachers' Professional Development as the Basis for Building Connections Between Communities Amy Wright, Janet Walter	3-1139	
<b>Teacher Beliefs</b>		
Interns' and Novice Teachers' Stresses While Attempting NCTM Standards-Based Teaching [SBT] Gary Lewis	3-1274	Stevenson
Reconceptualizing the Mathematical Knowledge and Understandings of Elementary-School Teachers David Feikes, Keith Schwingendorf	3-1385	
Life Stories and Concept Maps: A Means for Understanding Mathematics Beliefs and Practices Ann LeSage	2-699	
<b>Preservice Teacher Beliefs</b>		
Examining the Perceptions and Quality of Alternatively Prepared Teachers Nikita Patterson, Christine Thomas, Clara Okoka	3-1267	Baker
Math and Education Faculty Working to Improve Content Knowledge for Pre-Service Elementary Teachers Janice Richardson, Lisa Beuerle	3-1271	
Preservice Teachers' Beliefs and Conceptions About Mathematics Teaching and Learning Misfer AISalouli	2-950	
<b>Algebra</b>		
Different Forms of Mathematical Thinking in High School Activities Maria de Lourdes Guerrero, Antonio Rivera	1-292	Scott A
Understanding Early Algebra Students' Notions of Formal Representations Using Think-Aloud Protocol Analyses Joyce Meredith, Mitchell Nathan	1-295	
The Cognitive Development of Students From 9 <sup>th</sup> Grade to College in the Learning of Linear and Quadratic Functions Ernesto Colunga, Enrique Galindo	1-198	

	<b>Page</b>	<b>Room</b>
<b>Geometry</b>		
Students' Strategies for Measuring the Length of Diagonal Line Segments on a Grid Douglas Corey	1-384	Wren C
Interdisciplinary Research on Spatial Sense Learning With Three Communities of Secondary Students Patricia Marchand	1-386	
<b>Technology</b>		
Mathematics Virtual Learning Village: Occassioning Student Teachers Learning to Teach Mathematics Joyce Mgombele	3-1276	Rossetti A
Connecting Through e-Journals: Bridges Between Discourse Communities Phyllis Bolin, M. Jayne Fleener	3-1506	
<b>Fractions</b>		
Learning to Use Fractions: Examining Middle School Students' Emerging Fraction Practices Debra Johanning	2-546	Turner
A Study of Fourth-Grade Students' Explorations into Comparing Fractions Suzanne Reynolds	2-548	
Making Meaning of Proportion: A Study of Girls Olof Steinthorsdottir	2-550	
<b>Assessment</b>		
Understanding Mathematical Creativity: A Framework for Assessment in the High School Classroom Bharath Sriraman	1-350	Rossetti C
Developing Mathematics Teaching Assistants' Conceptions of Assessment Joan Kwako	3-1130	
<b>Discussion in Mathematics</b>		
Levels of a Teacher's Listening When Teaching Open Problems in Mathematics Erkki Pehkonen, Lisser Rye Ejersbo	2-871	Carlyle B
Moving Beyond Serial Presentations: Conditions for Involving Students in Reflective Discourse Jeffrey Choppin	2-882	
<b>Other Communities</b>		
Quantities Structured in Tens, Fives and Ones: A Case of Japanese Grade 1 Students Aki Murata	3-1524	Whistler
Teaching Mathematics to Inuit Children in Nunavik: Taking into Account the Environment and the Culture Louise Poirier	2-878	
<b>Secondary Mathematics</b>		
The Role of Reverse Thinking in the Contexts of Limit Kyeong Hah Roh	1-191	Duchesse
Teaching an Application-Oriented High School Mathematics Curriculum: The Teacher's Perspective Debbie Ziegler, Olive Chapman	3-1380	
Developing Conceptually Transparent Language for Teaching Through Collegial Conversations Ilana Horn	2-860	

	<b>Page</b>	<b>Room</b>
<b>Discourse</b>		
An Examination of Textbook “Voice”: How Might Discursive Choice Undermine Some Goals of the Reform? Beth Herbel-Eisenmann	2-862	Wren A
Motivational Beliefs and Goals of Middle School Students in Discussion-Oriented Mathematics Classrooms Amanda Hoffmann	2-672	
<b>Technology</b>		
Evaluating the Incorporation of Computational Programming Activities for Mathematical Learning in Mexican Schools Ana Isabel Sacristan, Elizabeth Esparza, Juan Carlos Xique	3-1504	Wren B
Interdisciplinary Uses of Graphing Calculators in Mathematics and Social Studies Clara Okoka, John Lee	3-1509	

**4:20 - 5:00 p.m.**

### **Research Reports - Session 3**

---

	<b>Page</b>	<b>Room</b>
Understanding the Meaning and Representation of Straight Line Solutions of Systems of Differential Equations Maria Trigueros	1-127	Scott B
Lortie’s Apprenticeship of Observation Revisited Denise Mewborn, Andrew Tyminski	3-1183	Rossetti B
Thinking, Feeling, Acting Like a Mathematician: Women and People of Color in Doctoral Mathematics Abbe Herzig	2-721	Wren A
Hidden Mathematics Curriculum and Technology in K-12 Teacher Education Sergei Abramovich, Peter Brouwer	3-1191	Scott A
Graph Theory: A Topic for Helping Secondary Teachers Develop Innovative Teaching Strategies Skip Wilson, Olgamary Rivera-Marrero	3-1337	Carlyle A
The Beliefs and Conceptions of Elementary Preservice Teachers Kelly McCormick, Ayfer Kapusuz, Misfer AlSalouli	2-917	Rossetti A
Sixth Grade Mathematics Teachers in Transition: A Case Study Cheryl Roddick, Trisha Bergthold	3-1021	Wren C
Examining Asynchronous and Synchronous Communication in an Online Mathematics Teacher Education Course Maria Fernandez, Sraboni Ghosh	3-1029	Windsor
Students’ Processes of Reconstructing Mathematical Relationships Through the Use of Dynamic Software Manuel Santos-Trigo	2-475	Baker
Design of Activities to Observe the Cognitive Structure of Students Exposed to Tasks Which Involve Co-variation of Quantities Juan Estrada – Medina	1-217	Rossetti C
A Series Problem in Geometria and Arithmetica: The Representation Schemes of Preservice Secondary Mathematics Teachers Leslie Aspinwall, Kenneth Shaw, Hasan Unal	2-463	Austin

	<b>Page</b>	<b>Room</b>
A Study of Students' Understanding of Problems Involving Conditional Probabilities Through a Semiotic Analysis of Their Representation of the Problems Ana Lucia Dias	1-405	Whistler
Talking About Proportions Conceptually: Orchestrating Bottom-Up Whole-Class Conversations Jose Luis Cortina, Qing Zhao, Paul Cobb, Kay McClain	3-1423	Stevenson
From Concrete Representations to Abstract Symbols Elizabeth Uptegrove, Carolyn Maher	2-577	Turner
Ideas Sense Making and the Early Development of Reasoning in an Informal Mathematics Setting Arthur Powell, Carolyn Maher, Alice Alston	2-585	Carlyle B
"Just go": Mathematics Students' Critical Awareness of the De-Emphasis of Routine Procedures David Wagner	2-737	James
Voice and Success in Non-Academic Mathematics Courses Ralph Mason, Janelle McFeetors	2-745	Duchesse
Course-Taking and Equity: The Efforts of One High School Mathematics Department Lecretia Buckley	2-815	Wren B
<b>Plenary Follow-up Session</b>		<b>Churchill Court</b>
Experimental Teaching as a Way of Building Bridges Robert Speiser, Brigham Young University		
<b>5:00 - 6:00 p.m.</b> Graduate meetings		TBA
<b>7:00 p.m. - . . .</b> Dinner		<b>Churchill Ballroom</b>

## Saturday, October 23, 2004

<b>7:30 - 8:45 a.m.</b> Breakfast Buffet		<b>Churchill Ballroom</b>
<b>9:00 – 10:20 a.m.</b> Working/Discussion Groups		
<b>Working Groups</b>		
Complexity of Learning to Reason Probabilistically James Tarr, Hollylynne Stohl		Windsor
Gender and Mathematics: Moving Toward New Spaces Diana Erchick, Peter Applebaum, Joanne Rossi Becker, Suzanne Damarin		Stevenson
Geometry and Technology Keith Leatham, Jean McGehee		Scott A
Knowledge of Algebra for Teaching Gail Burrill, Joan Ferrini Mundy, Sharon Senk, Dan Chazan		Rossetti B

Learning and Teaching with Proof Despina Stylianou, Maria Blanton	Carlyle A A
Mathematics Teaching Assistant Preparation and Development Research Natasha Speer, Timothy Gutmann, Teri Murphy	Scott B
Models & Modeling Richard Lesh, Guadalupe Carmona, Thomas Post	Baker
Procedural and Conceptual Knowledge in Mathematics William James Baker, Bronislaw Czarnocha, Vrunda Prabhu	Rossetti A

## Discussion Group

Exploring the Use of Clinical Interviews in Teacher Development Rebecca Ambrose, Cynthia Nicol, Sandra Crespo, Vicki Jacobs, Patricia Moyer, Hanna Haydar	Rossetti C
--	------------

## 10:20 - 10:40 a.m.

Break

## 10:40 a.m. – 11:20 a.m.

### Short Oral Reports- Session 2

---

	Page	Room
<b>Calculus</b>		
Learners' Conceptions of the Limit in Calculus Allan Brown	1-193	Rossetti B
Conceptions of Continuity: One Advanced Placement Calculus Student's Thinking Leah Bridgers, Helen Doerr	1-197	
Reforming Calculus Teaching: Oral Assessment Before Tests Mary Nelson	1-353	
<b>Assessing Growth</b>		
Project MENTOR: Assessing the Growth of Mathematical Content Knowledge Sandy Dawson, Kyaw Soe, Joseph Zilliox, Alicia Aguon	3-1132	Baker
The Characteristics of Two Key Teachers in a K-3 Teacher Professional Development Context Ok-Kyeong Kim	3-1134	
<b>Secondary School Mathematics</b>		
Change in Prospective Teachers' Perspectives About Effective Teaching of Mathematics: Structural Patterns and Qualitative Categories Hea-Jin Lee, Sherri Burnett, Christopher Fay	2-956	Scott A
Teachers' Beliefs Influencing the Implementation of a Project-based High School Mathematics Curriculum Elizabeth Wood, Olive Chapman	2-954	
<b>Other Communities</b>		
Teacher Efficacy in Preservice Mathematics: Changing Perception Through Experiences Cathy Bruce	3-1279	Rossetti A
The Talk of Scaffolding: Communication That Brings Adult Learners to Deeper Levels of Mathematical Understanding Lillie Albert, Gail Mayotte, Cynthia Phelan	3-1137	

	<b>Page</b>	<b>Room</b>
The Beliefs and Effective Practices of Community College Mathematics Faculty Regarding Students With Learning Disabilities Donna Massey	2-952	Rossetti A
<b>Fractions and Decimals</b>		
Student Attitudes and Perspectives Involving Mathematics Education in Elementary and Middle School Settings Regina Mistretta	3-1144	Rossetti C
Exploring Middle School Teachers Pedagogical Content Knowledge of Fractions and Decimals Sonia Hristovitch, Melissa Mitcheltree	3-1142	
<b>Lessons and Materials</b>		
Using Scenarios to Enhance the Mathematical Understanding of Pre-Service Secondary Teachers Beverly Hartter	3-1281	Carlyle A
Exploring the Challenges of Learning to Teach Reform-Oriented Mathematics Lessons Amy Parks	3-1283	
Standards-Based Curriculum Materials and Teachers Gwendolyn Lloyd, Beth Herbel-Eisenmann	3-1285	
<b>Conceptions of Mathematics</b>		
A Framework for Understanding the Relationship Between Students' Conceptualizations of Mathematics and Their Developing Pedagogy Jason Silverman	3-1290	Carlyle B
An Approach to Incorporating Lesson Study in Elementary Preservice Courses Margaret Sinclair	3-1287	
Lyn's Representation of Slope as an Iterative Process Janet Walter, Hope Gerson	3-1389	
<b>Elementary School Teaching</b>		
Investigating Teaching and Learning Subtraction that Involves Renaming Using Base Complement Additions Peter McCarthy	3-1393	Duchesse
Elementary and Secondary School Students' Misconceptions of Mathematical Set Concept Ibrahim Budak, Ayfer Kapusuz	1-195	
<b>Proof</b>		
Overcoming Difficulties with Proof as a Group LeeAnna Rettke, Michelle Zandieh, Jessica Knapp	2-677	Scott B
Examples as Tools for Understanding Proof in Geometry Jessica Knapp, Michelle Zandieh	2-674	
Mathematizing Intuitive Notions of Symmetry and Transformations for Use in More Formal Reasoning Michelle Zandieh, Sean Larsen, Denise Nunley	1-199	
<b>Algebra</b>		
Using the SOLO Taxonomy to Evaluate Student Learning of Function Concepts in Developmental Algebra Robin Rider	1-199	Wren B
Quantitative Operations as a Basis for Algebraic Reasoning and Teaching Practices Amy Hackenberg, Erik Tillema	1-302	

	<b>Page</b>	<b>Room</b>
Resolution of Arithmetic-Algebraic Word Problems With the Use of the CAS (Computer Algebra System) as Symbolic Manipulator Miguel Benito Huesca Esparza	3-1512	Wren B
<b>Technology</b>		
Dynamic Area Concepts Instruction Design Based on Representation Perspectives Chien Chun	1-389	Wren C
Investigating the Development of a Computational Science Education Community Mary Searcy, Jill Richie	2-894	
<b>Algebra</b>		
Confronting Teachers' Beliefs About Students' Algebra Development: An Approach for Professional Development Mitchell Nathan	1-312	Stevenson
Large Numbers and Generalization in the Absence of Algebraic Notation Rahul Malhotra, Lara Alcock	1-308	
An Undergraduate Student's Understanding of Algebra: A Numerical Approach Erhan Haciomeroglu, Elizabeth Jakubowski, Leslie Aspinwall	1-300	
<b>Probability and Statistics</b>		
High School Students' Levels of Thinking in Regard to Analyzing Univariate Data Sets Randall Groth	1-414	Windsor
Emptying the Bowl: An Investigation of Probability and Mathematics That Preservice Elementary School Teachers Need to Know Michael Edwards	3-1295	
Undergraduate Students' Meanings About Effect of Sample Size in the Shape and Variability of Sampling Distributions Santiago Inzunza, Ernesto Sanchez	1-416	
<b>Mathematics Learning</b>		
Mathematics Learning in a Culture of Secrecy and Possession Lynn Gordon, Gladys Sterenberg	2-889	Wren A
Simple Rate Verbal Problems in Mathematics Textbooks for Primary Education in Mexico: A Theoretical and Empirical Study Verónica Vargas-Alejo, José Guzmán Hernandez	2-517	
Domain-Specific Mathematics Achievement and Socio-Economic Gradients: A Comparison of Canadian and United States Education Systems George Frempong	1-355	
<b>Communication</b>		
Understanding-in-Discourse as a Tool for Coordinating the Individual and Social Aspects of Learning Daniel Siebert, Steven Williams	2-892	Whistler
Ways of Seeing: Unexpected Student Solutions and Subsequent Teacher Responses Ann Kajander	3-1391	
<b>Developing Mathematics</b>		
A Microanalysis of Planning and Implementing an Introductory Lesson on Linear Functions Amy Roth McDuffie	1-310	Turner

	<b>Page</b>	<b>Room</b>
Division with Fractions: A Study of Pre-Service Teachers' Mathematical Subject Matter Knowledge Sherri Cianca	3-1292	Turner
The Development of a Knowledge Base for Teaching Among Undergraduate Mathematics Faculty Teaching Calculus Kimberly Santucci, Thomas DeFranco	3-1387	

**11:30 a.m. – 12:10 p.m.**

**Research Reports - Session 4**

---

Exploring an Elusive Link Between Knowledge and Practice: Students' Disciplinary Orientations Melissa Gresalfi, Jo Boaler, Paul Cobb	2-757	Stevenson
Enculturation: The Neglected Learning Metaphor in Mathematics Education David Kirshner	2-765	Rossetti B
Variation, Variables and Semiotic Mediation in a Dynamical Environment Luis Moreno-Armella, Marco Santillan	1-223	Scott B
Evidence and Justification: Prospective PREK-8 Teachers' Proof-Making and Proof-Evaluating LouAnn Lovin, Laurie Cavey, Joy Whitenack	3-1201	Scott A
Prospective Teacher Educators' Developing Perspectives on Teacher Education Through the Creation of Multimedia Case Studies Joanna Masingila	3-1343	Rossetti A
Increasing the Leadership Capacity of Elementary School Teachers in Mathematics Jo Olson	3-1037	Rossetti C
Preservice Teachers' Beliefs About Mathematical Understanding Cigdem Haser, Jon Star	2-925	Wren C
Improving Students' Mathematical Understandings: An Exploration into Teacher Learning in an Urban Professional Development Setting Babette Benken, Nancy Brown	3-1043	Whistler
Positioning Teachers to Enact Standards-Based Instruction Dovie Kimmins, Michaele Chappell	3-1049	Carlyle B
The Impact of Teacher Actions on Student Proof Schemes in Geometry Sharon McCrone, Tami Martin	2-593	Baker
Teachers' Conceptions Related to Differential Calculus' Concepts Fernando Hitt, Alexander Borbon	1-143	Carlyle A
From Arithmetic to Algebra: A Study of the Special Case of Geometric Formulas Simon Mochon, M. Carmen Landeros	1-229	James
A Teacher's Model of His Students' Algebraic Thinking: "Ways of Thinking" Sheets Jean Hallagan	1-237	Austin
An Investigation of Teachers' Personal and Pedagogical Understanding of Probability Sampling and Statistical Inference Yan Liu, Patrick Thompson	1-407	Windsor
The Evolution of Formal Mathematical Reasoning: A Case Study of the Uniqueness Theorem in Differential Equations Chris Rasmussen	2-603	Wren B

	<b>Page</b>	<b>Room</b>
On the Instrumentation Process of a Computational Tool Martha Garcia Rodriguez, Manuel Santos Trigo	3-1433	Wren A
Reasoning and Proving in School Mathematics Curricula: An Analytical Framework for Investigating the Opportunities Offered to Students Gabriel Stylianides, Edward Silver	2-611	Duchesse
Lesson Study in Preservice Education Joseph Zilliox, Maria Fernandez	3-1237	Turner

**12:15 - 1:45 p.m.**

**Lunch and Business Meeting**

**Churchill Ballroom**

PME-NA Chair: Doug McDougall

**1:45 - 3:00 p.m.**

**Poster Sessions and Exhibits**

**Mountbatten Ballroom and Hall**

---

	<b>Page</b>
Students' Colloquial Discourse on Infinity and Limit and Mathematical Discourse: The Case of American and Korean Students Dong-Joong Kim	1-201
Process or Object? – Students' Thinking About Functions and Graphs Garrett Kenehan	1-202
The Relationships Between the Informal Strategies Students Use in Solving Problems in Proportional Situations Gulseren Karagoz Akar, Tad Watanabe	1-203
Student Use (and Misuse) of Graphs and Rates of Change in Economics Eric Hsu, Victor Contini	1-205
Fifteen Years Later: Multiple Representations in Upper Level High School Mathematics Charity Cayton	1-315
Learning Disability Children Make Sense of the Equal Sign: Moving From Concrete to Abstractions and Generalizations Ruth Beatty	1-316
Children's Emerging Informal Understanding of Multiplication in the Context of Geometric Patterns and Function Machines Christine Mann, Julie McDonnell	1-318
Reversability of Children's Thinking About the Relationship Between Numeric and Geometric Patterns Kerry Scrimger	1-319
Mathematical Knowledge Building: Students Collaborate to Improve Ideas of Growing Patterns Patricia MacDonald, Zoe Donoahue, Arana Shapiro	1-321
Making Sense (or Not) Out of Linear Equation Solving Marcy Wood, Jon Star	1-323
Mathematical Modelling Through Knowledge Building: Explorations of Algebra, Numeric Functions and Geometric Patterns in Grade 2 Classrooms Susan J. London McNab	1-324

	<b>Page</b>
A Collaborative Teaching Approach to Algebraic Reasoning With Grade Four Students: Understanding Functions Through Mathematical Discourse Samantha Barkin, Gina Shillolo	1-326
Three Grade 2 Classrooms Participate in a Knowledge Building Approach to Pattern Exploration Joan Moss, Zoe Donoahue, Patricia MacDonald, Arana Shapiro, Janet Eisenband	1-329
Oral Exams as a Tool for Teaching and Assessment Margo Kondratieva	1-358
Deconstructing 'Alternative' Assessment: Moving Beyond/Within a Discursive 'Other' to Link Curriculum Instruction and Assessment in Mathematics Kathleen Nolan	1-359
The Role of Peirce's "Interpretant" in Communities of Geometric Inquiry - Past, Present, and Future Norma Presmeg	1-392
The Role of Intuition in Pre-Service Teachers' Probabilistic Problem-Solving Avikam Gazit	1-418
The Meaning of 'Mean': Teacher Perception of Student Understanding Within a College Statistics Course Steven Tuckey	1-419
Problem Posing as a Pedagogical Tool: A Teacher's Perspective Heidi Staebler	2-519
Interacting Levels of Design: Students and Teachers Reflecting About Mathematical Modeling Angela Hodge, Caroline Yoon	2-523
Designing Mathematical Modeling Activities for First-Year Engineering Margret Hjalmarson, Tamara Moore, Travis Miller	2-524
The Instructor's Role in the Development of a Classroom Community in an Undergraduate Number Theory Course: A Preliminary Report Stephanie Nichols, Jennifer Smith	2-679
Linking Geometric Algebraic and Combinatorial Thinking Geoffrey Roulet, Kate Mackrell, Krista Taylor, Beverly Farahani	2-681
A Design Study: The Development Diffusion and Appropriation of Mathematical Ideas in Middle School Students Sandra Richardson	2-896
Problem Centered Learning at the College Level: Students' Perspectives Sandra Trowell	2-898
The Teaching Beliefs and Views About Mathematics of Early Recruitment Mathematics Teachers Kurt Oehler, R. Jason LaTurner, Jennifer Smith	2-959
'How Do I Know if They 're Learning?': An Investigation of a Mathematician's Struggle to Change Her Teaching Sera Yoo, Jennifer Smith	2-960
Principled Use of Classroom Artifacts in Professional Development Lynn Goldsmith	3-1146
Evolving Practices of Sixth Grade Mathematics Teachers Trisha Bergthold, Cheryl Roddick	3-1148
A Prototypic Advanced Mathematics Education Program That Connects Communities of Practitioners and Researchers Karen Schultz, Mickey Washburn Jr.	3-1149

	<b>Page</b>
Beyond Implementation: Improving Teachers' Use of an Innovative Middle School Mathematics Curriculum Melissa Gilbert, Alison Castro, Dana Gosen, Edward Silver	3-1150
Curriculum Negotiation and Professional Development in Ontario Mathematics Education Daniel Jarvis	3-1152
Supporting the Development of Middle School Mathematics Teachers' Evolving Models for the Teaching of Algebra Sandra Berry	3-1154
Lesson Study as a Vehicle for Teacher Change Lynn Hart, Jane Carriere	3-1155
Reflection and Collaboration Through Lesson Study: The Affects on Student Achievement in Mathematics Laurie Riggs, Diane Barrett	3-1156
Listening to Student Understanding: Pre-Service Teachers' Difficulties Sharon Strickland	3-1298
Curriculum Negotiation and the Implementation of Conceptually Different Materials: Preservice Elementary Student Teachers' Place-Based Experiences Stephanie Behm, Gwendolyn Lloyd, Laura Spielman	3-1300
Building Communal Understanding of Proportional Reasoning Using Instructional Representations Kelli Slaten, Sarah Berenson	3-1303
A Conceptual Orientation to Teaching Linear Functions Lisa Jilk	3-1396
High School Teachers' Use of Multiple Representations When Teaching Functions in Graphing Calculator Environments Levi Molenje	3-1514
Anchoring Problems in Technology-Rich Environments to Enhance Math Skills of Adolescents Brian Bottge, Jungmin Kwon	3-1515
Mathematics Learning Objects for At-risk Secondary Student Results of an Online Survey Margaret Sinclair, Jijun Deng	3-1516
Access to Computer Technologies and Mathematics Outcomes: Findings from Canadian Grade 8 Mathematics Classrooms George Frempong, Jijun Deng, Shenyu Huang	3-1517
Teaching Long Division to Learning Disabled Students: A Psychological Analysis of Two Algorithms Ljiljana Vuletic, Shannon Scullion, Joan Moss	3-1526
Designing Educational Software for Teachers: Animations in Mathematics Caroline Yoon, Kristof Robinson, Travis Miller, Jennifer Fonseca	3-1518
Understanding Division by Fractions: An Exploratory Study of 7 Mathematics Education Graduate Students Andreas Kyriakides	3-1398
How Mathematical Problems are Solved Rita Mbabazi Ntege	

**3:00 - 3:40 p.m.**

---

**Research Reports - Session 5**

---

	<b>Page</b>	<b>Room</b>
The Importance, Nature and Impact of Teacher Questions Jo Boaler, Karin Brodie	2-773	Stevenson
Language & Belief Factors in Learning & Teaching of Mathematics & Physics: A Study of Three Teachers Michelle L. W. Bower, Nerida Ellerton	2-783	Scott A
Impact of Research on Student Teachers' Conceptions About Improving Mathematics Written Tests Rosa Ferreira	3-1209	Baker
Preservice Teachers' Use and Understanding of Place Value Signe Kastberg	3-1217	Rossetti A
Mathematics for Teaching: Facilitating Knowledge Construction in Prospective High School Mathematics Teachers Irene Bloom	3-1349	Rossetti C
Students' Development of Meaningful Mathematical Proofs for Their Ideas Lynn Tarlow	2-647	Wren A
Using Student Voice to Deconstruct Traditional Structures of Cooperative Mathematical Problem Solving Lisa Sheehy	2-685	Rossetti B
Investigating the Development of a Professional Mathematics Teaching Community Chrystal Dean	3-1057	Carlyle B
An Exploration of "Fairness": Grade 5/6 Students' Theorizing About Representations of Central Tendency in Student-Generated Numeric Data Sets Susan J. London McNab	2-471	Austin
Using Spatial Tasks to Assess Numeracy Heather Kelleher, Cynthia Nicol, Carole Saundry	3-1065	Carlyle A
Decoding Collaborative Learning in a Wireless Handheld Computing Environment Tobin White	3-1441	Duchesse
The Aesthetic Development of Mathematicians Nathalie Sinclair	1-151	Wren B
Tracking Primary Students' Understanding of Patterns Lesley Lee, Viktor Freiman	1-245	Scott B
Quantitative Literacy: The Creation of a Framework to Analyze Instructional Materials for the Promotion of a Literate Society Stephanie Behm, Jesse Wilkins	1-343	Wren C
Embodied Spatial Articulation: A Gesture Perspective on Student Negotiation Between Kinesthetic Schemas and Epistemic Forms in Learning Mathematics Dor Abrahamson	2-791	Whistler
How do Mathematicians Validate Proofs? Keith Weber, Lara Alcock	2-621	Turner
Implementing the NCTM's Reasoning and Proof Standard with Undergraduates: Why Might This Be Difficult? Stacy Brown	2-629	James

3:50 - 4:30 p.m.

Research Reports- Session 6

---

	Page	Room
The Transition From Secondary to Post-Secondary Mathematics: Changing Features of Students' of Students' Mathematical Knowledge and Skills and Their Influence on Students' Success Ann Kajander, Miroslav Lovric	1-155	Windsor
Meaningful Mathematical Activity: Opportunities for Linking in Diverse Mathematics Classrooms Victoria Hand	2-799	Turner
A Model for Examining the Nature and Role of Discourse in Middle Grades Mathematics Classes Mary Truxaw, Thomas DeFranco	2-805	Rossetti A
"All Triangles are Similar": Tracing Rose's Understanding of Similarity Using Lesson Plan Study Clarence Davis	3-1223	Austin
A Framework for Characterizing the Transition to Advanced Mathematical Thinking Jennifer Smith	1-163	Rossetti C
How Effective Online Course Activities Changed a Teacher's Practice Elizabeth Jakubowski, Darryl Corey, Hasan Unal	3-1073	Scott B
Affects of Engagement in Reform-Based Practice on a College Instructor's Conceptions of Mathematics Riaz Saloojee	2-933	Wren C
Understanding and Development of Basic Geometric Properties: Innovation in a Low-Level Mathematics Classroom Veronica Hoyos	3-1449	Wren A
Math-Anxious Elementary Teachers' Change Process in a Graduate Course Aimed at Building Math Confidence and Reducing Anxiety Rina Cohen, Peyton Leung	3-1079	Scott A
Which Way is the "Best"? Students' Conceptions of Optimal Strategies for Solving Equations Jon Star, Jagdish Madnani	2-483	Carlyle B
Cognitive Abilities and Errors of Students in Secondary School in Algebraic Language Processes Raquel Ruano, Martin Socas Robayna, Mercedes Palarea Medina	1-253	Baker
Spatial Ability Achievement and Use of Multiple Representations in Mathematics Evrin Erbilgin, Maria Fernandez	1-263	Carlyle A
What Discussions Teach Us About Mathematical Understanding: Exploring and Assessing Students' Mathematical Work in Classrooms Nick Fiori, Jo Boaler, Nikki Cleare, Jennifer DiBrienza, Tesha Sengupta	2-491	Rossetti B
The Difficulty of Understanding 'Length x Width': Does it Help to Give Squares to Make it Understandable? Constance Kamii	1-363	Stevenson
Learning in a Computer Algebra System (CAS) Environment Michael Meagher	3-1457	Whistler
Communicating Mathematics Online - Comparison of Expert and Peer Tutoring Dragana Martinovic	3-1465	Duchesse
Key Ideas: The Link Between Private and Public Aspects of Proof Manya Raman	2-635	Wren B
What Counts as Proof? Investigation of Pre-service Elementary Teachers' Evaluation of Presented 'Proofs' Soheila Gholamazad, Peter Liljedahl, Rina Zazkis	2-639	James

**4:30 – 6:00 p.m.**

**Plenary Session:**

**Churchill Ballroom**

Local Theoretical Models in Algebra Learning: A Meeting Point in Mathematics Education  
Teresa Rojano, Centro de Investigacion y de Estudios Avanzados

**6:30 p.m. - . . .**

**This evening is open for delegates. There is no dinner arranged by the conference and so you are able to take advantage of all the restaurants and entertainment in Toronto. We will posts suggestions for dining and entertainment on the website and we will also have organized sign-up sheets for those wishing to create their own groups upon arrival.**

**Sunday, October 24, 2004**

**7:15 - 8:15 a.m.**

Breakfast Buffet

**Churchill Ballroom**

**8:30 - 10:00 a.m.**

**Working Groups**

Complexity of Learning to Reason Probabilistically  
James Tarr, Hollylynne Stohl

Windsor

Gender and Mathematics: Moving Toward New Spaces  
Diana Erchick, Peter Applebaum, Joanne Rossi Becker, Suzanne Damarin

Stevenson

Geometry and Technology  
Keith Leatham, Jean McGehee

Scott A

Knowledge of Algebra for Teaching  
Gail Burrill, Joan Ferrini Mundy, Sharon Senk, Dan Chazan

Rossetti B

Learning and Teaching with Proof: A “Proof” Story Across the Grades: Beginning a Conversation  
on the Learning of Proof in Grades k-16  
Despina Stylianou, Maria Blanton

Seymour

Mathematics Teaching Assistant Preparation and Development Research  
Natasha Speer, Timothy Gutmann, Teri Murphy

Scott B

Models & Modeling  
Richard Lesh, Guadalupe Carmona, Thomas Post

Baker

Procedural and Conceptual Knowledge in Mathematics  
William James Baker, Bronislaw Czarnocha, Vrunda Prabhu

Rossetti A

**10:00 -10:15 a.m.**

Break

**10:20 - 11:00 a.m.**

**Research Reports - Session 7**

	<b>Page</b>	<b>Room</b>
Irrational Numbers: Dimensions of Knowledge Natasa Sirotic, Rina Zazkis	1-171	Seymour
Calculus Textbooks in the American Continent: A Guarantee For Not Understanding Physics Ricardo Pulido	2-823	Scott A
Aristotle as Secondary Mathematics Teacher Educator: Metaphors Strengths and Epistemological Understanding Whitney Johnson, Bill Rosenthal	3-1230	Wren C
Assessing Teacher Knowledge (in Action) Elaine Simmt, Brent Davis	3-1357	Stevenson
Students' Perspective on Argumentation in a Mathematics Classroom Darlinda Cassel, Anne Reynolds	3-1363	Whistler
Impact of Alternatively Prepared Teachers in Urban Mathematics Classrooms Pier Angeli Junor, Christine Thomas	3-1087	Rossetti A
Teachers Guiding Inquiry/Argument Cultures: Two Contrasting Orientations Susan Nickerson	3-1095	James
A Multi-Dimensional Approach to Mathematics In-Service John Ross, Douglas McDougall, Cathy Bruce, Sonia Ben Jaafar, Jane Lee	3-1101	Scott B
Voicing Success in Mathematics Class: Andrea's Story of Success Janelle McFeetors	2-827	Rossetti C
Middle-School Students' Experience with the Equal Sign: Saxon Math Does Not Equal Connected Mathematics Nicole M. McNeil, Laura Grandau, Ana C. Stephens, Daniel E. Krill, Martha W. Alibali, Eric J. Knuth	1-271	Rossetti B
Building Up the Notion of Dependence Relationship Between Variables: A Case Study with 10 to 12-Year Old Students Working with SimCalc Elvia Perrusquia, Teresa Rojano	1-277	James
Children's Evolving Understanding of Polyhedra in the Classroom Rebecca Ambrose, Garrett Kenehan	1-369	Baker
Developing Understanding in Mathematical Problem-Solving: A Study With High School Students Armando Sepúlveda, Manuel Santos-Trigo	2-499	Duchesse
Tools for Thought and Communication Kathryn Chval	3-1473	Turner
The Interplay Between Technology Design and Students' Control of Problem Solving Karen Hollebrands, Hollylynn Stohl	3-1481	Wren B
Making Sense of Learning Mathematics John H. Mason	3-1371	Windsor

### **Plenary Follow-up Session**

Local Theoretical Models in Algebra Learning: A Meeting Point in Mathematics Education Teresa Rojano, Centro de Investigacion y de Estudios Avanzados		James
--	--	-------

11:10 a.m. – 11:50 a.m.

**Research Reports – Session 8**

---

	<b>Page</b>	<b>Room</b>
The Effect of Learning Objects on Middle School Students' Mathematical Thinking George Gadanidis, Karen Schindler	3-1489	Scott A
Working with Learner Contributions: Coding Teacher Responses Karin Brodie	2-689	Rossetti A
Drawing on Diverse Social, Cultural, and Academic Resources in Technology-Mediated Classrooms Nancy Ares, Walter Stroup	2-837	Austin
Mathematical Authority in Preservice Elementary Teachers' Experiences with Standards-Based Curriculum Materials Gwendolyn Lloyd	3-1245	Wren C
Longitudinal Study of Professional Development to Build Primary Teacher Expertise in Teaching Mathematics Chris Suurtamm, Barbara Graves, Nancy Vezina	3-1111	Baker
The Process and Influences of District Leaders Becoming Members of a Professional Teaching Community Teruni Lamberg	3-1119	Seymour
Viewing Teachers' Beliefs as Sensible Systems Keith Leatham	2-941	Windsor
Case Studies of Future Secondary Level Mathematics Teachers' Mode of Explaining Jérôme Proulx, Carolyn Kieran, Nadine Bednarz	3-1253	Rossetti B
How Are Students' Understandings of Function Affected by Engaging in a Curriculum Module in Knot Theory? Neil Portnoy, Thomas Mattman	1-179	Rossetti C
A Semiotic Framework For Variables Aaron Weinberg	1-285	James
Learning to Remember: Mathematics Teaching Practice and Students' Memory Catherine Kulp-Brach	1-377	Duchesse
The Variation in the Understanding of the Literal as a Variable Valois Najera, Luis Moreno-Armella, Marco Santillan	3-1497	Wren B
Improving the Formulation Component of Proofs Using a Network Chat Environment Within Dynamic Geometry Activities Ernesto Sanchez, Ana Isabel Sacristan, Miguel Mercado	2-655	Wren A
Mathematical Images for Workplace Training: The Case of John, A Plumbing Apprentice Lyndon Martin, Lionel LaCroix, Sue Grecki	2-663	Scott B
Comparing Solutions Across The Divide Roberta Schorr, Sylvia Bulgar	2-845	Stevenson