Program
for the Special Interest Group of the Mathematical Association of America
on Research in Undergraduate Mathematics Education

Twelfth Conference on Research in
Undergraduate Mathematics Education

Raleigh Marriott, Raleigh, NC
February 26 – March 1, 2009

Note: Rooms are subject to change

THURSDAY, FEBRUARY 26

5:00 pm – 7:00 pm  Registration – Marriott Reception Area
7:00 pm – 7:15 pm  Welcome – State AB
7:15 pm – 8:15 pm  Plenary –State AB : Orit Zaslavsky
There Is More to Examples than Meets the Eye
8:15 pm – 10:00 pm  Reception – University Ballroom

FRIDAY, FEBRUARY 27

Friday 7:30 am – 5:00 pm  Registration – Marriott Reception Area
Friday 7:30 am – 8:30 am  Continental Breakfast – State AB
Friday 8:30 am – 9:00 am  Contributed Reports

| Congressional A | Michael Oehrtman  
| Arizona State University  
| Marilyn Carlson  
| Arizona State University  
| Judy Sutor  
| Arizona State University  
| Linda Agoune  
| Arizona State University  
| Carla Stroud  
| Arizona State University |
| Congressional B | Julie Fredericks  
| Portland State University  
| Martha VanCleave  
| Linfield College |
| University A | Po-Hung Liu  
| National Chin-Yi University of Technology |

Meaningful Collaboration in Secondary Mathematics and Science Teacher Professional Learning Communities
Student Mathematical Discourse and Team Teaching
Are Beliefs Believable? Really?
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<th>Time</th>
<th>Event &amp; Text</th>
<th>Contributors</th>
<th>Talks &amp; Presentations</th>
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<td>Friday 9:10 am – 9:40 am</td>
<td>Contributed Reports</td>
<td>University B Amanda Lambertus North Carolina State University</td>
<td>High-Achieving Young Women’s Perceptions of Mathematics in College</td>
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<td></td>
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<td>Sarah Berenson UNC, Greensboro</td>
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<td>Susan Bracken North Carolina State University</td>
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<tr>
<td>University C</td>
<td>Juan Pablo Mejia-Ramos</td>
<td>Rutgers University</td>
<td>Different Ways of Assessing the Persuasiveness of Mathematical Arguments</td>
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<td></td>
<td>Matthew Inglis</td>
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<tr>
<td>University A</td>
<td>Nicole Engelke</td>
<td>California State University, Fullerton</td>
<td>The Great Gorilla Jump: A Riemann Sum Investigation</td>
</tr>
<tr>
<td></td>
<td>Vicki Sealey</td>
<td>West Virginia University</td>
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Friday 9:50 am – 10:20 am  Contributed Reports

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<tr>
<th>congressional A</th>
<th>Aladar K. Horvath Michigan State University</th>
<th>Calculus Students’ Routines of Function Composition</th>
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<tr>
<td>University A</td>
<td>Christine Larson Indiana University</td>
<td>Student Interpretations of the Equals Sign in Matrix Equations: The Case of Ax=2x</td>
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<td>Michelle Zandieh Arizona State University</td>
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<td>Chris Rasmussen San Diego State University</td>
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<td>Frances Henderson San Diego State University</td>
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<tr>
<td>University B</td>
<td>Karen Hollebrands North Carolina State University</td>
<td>The Structure of College Geometry Students’ Arguments in the Presence of Technology¹</td>
</tr>
<tr>
<td></td>
<td>Ryan Smith North Carolina State University</td>
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<td></td>
<td>Anna Conner University of Georgia</td>
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Friday 10:20 am – 10:50 am Coffee Break – Outside State AB
Friday 10:50 am – 11:20 am Preliminary Reports
| Congressional A | Ann D. Bingham  
Peace College  
Carolann Wade  
Peace College | An Experiment in Teaching Algebra to Teacher Candidates |
| Congressional B | Aaron Weinberg  
Ithaca College | How Students Use Their Textbooks: Reading Models and Model Readers |
| University A | Allison McCulloch  
North Carolina State University | Mathematicians, Mathematics Educators and High School Mathematics Teachers Interpretations and Judgments Regarding High School Calculus Students’ Problem Solving Methods |
| University B | Keith Weber  
Rutgers University | Proving Is Not Convincing |
| University C | Estrella Johnson  
Portland State University  
Sonya Redmond  
Portland State University  
Joanna Bartlo  
Portland State University  
Jennifer Noll  
Portland State University | Students’ Intuitions and Informal Understandings of Margin of Error and Confidence |
| State A | Matthew Tziritas  
Concordia University | APOS Framework and Geometric Related Rates in a First Course in Calculus. |

Friday 11:30 am – 12:00 pm Preliminary Reports pm

| Congressional A | Todd CadwalladerOlsker  
California State University, Fullerton | A Model Analysis of Proof Schemes |
| Congressional B | Xuhui Li  
California State University, Long Beach | An Investigation of Mathematics Graduate Teaching Assistants’ Conceptions and Knowledge of Algebra in Relation to Their |
| University A | Peter Eley  
| North Carolina State University | How does the Implementation of an Inquiry Oriented Curriculum for Instruction on Euler’s Method Affect the Relationship between Intended Curriculum and Learned Curriculum? |
| University B | Kathyrn Rhoads  
| Rutgers University | The Teacher Internship Experiences of Prospective High School Mathematics Teachers |
| University C | Shandy Hauk  
| University of Northern Colorado  
| Bernadette Mendoza-Spencer  
| University of Northern Colorado  
| Allison Toney  
| University of Northern Colorado | Teaching this Beautiful Math |
| State A | Stacey A. Bowling  
| Arizona State University | Precalculus Student Understandings of Function Composition |
| State B | Kelli M. Slate  
| University of North Carolina, Wilmington | Folding Back and Connecting to Historical Mathematical Concepts |

Friday 12:00 pm – 1:20 pm    Lunch – State C

Friday 1:30-2:30 pm  Plenary Jere Confrey  
North Carolina State University

Friday 2:40 pm – 3:10 pm  Preliminary Reports

| University A | Lara Alcock  
| Loughborough University  
| Gavin Brown | Workbooks for Independent Study of Group Theory Proofs |
| University B | Jennifer Earles Szydik  
University of Wisconsin, Oshkosh  
Carol E. Seaman  
University of North Carolina,  
Greensboro | Development of an Instrument to Measure Mathematical Sophistication |
| --- | --- | --- |
| University C | Sepidah Steward  
University of Auckland  
Michael O. J. Thomas  
University of Auckland | Routes to the Formal World of Mathematical Thinking: A Teaching Framework |
| Congressional A | Jason K. Belnap  
Brigham Young University  
Michelle G. Withers  
Brigham Young University | Making Sense of Group Discussions: Analyzing Discourse Through Content Threads |
| Congressional B | Sarah Ives  
North Carolina State University  
Hollylynne Lee  
North Carolina State University  
Tina Starling  
North Carolina State University | Preparing to Teach Mathematics with Technology: Lesson Planning Decisions for Implementing New Curriculum |
| State A | Shiva Gol Tavaghi  
Simon Fraser University  
Nathalie Sinclair  
Simon Fraser University | Title: Beyond Static Imagery: How Mathematicians Think About Concepts Dynamically |

Friday 3:10 pm – 3:40 pm  Coffee Break - Southwest Foyer

Friday 3:40 pm – 4:10 pm  Contributed Reports

| Congressional A | Jennifer Kaplan  
Michigan State University  
Ed Corcoran  
Michigan State University | Lesson Study in Undergraduate Calculus: What Can We Learn About Teachers and Teaching from Lesson Study? (part 1) |
| University A | Sean Larsen  
Portland State University  
Joanna Barlto  
Portland State University  
Estrella Johnson  
Portland State University  
Faith Rutherford  
Portland State University | A Local Instructional Theory for the Guided Reinvention of the Quotient Group Concept. |
| University B | Tetyana Berezovski  
Saint Joseph’s University | Innovative Methodologies: The Study of Pre-service Secondary Mathematics Teachers’ Knowledge |
| Congressional A | Sam Otten  
Michigan State University  
Jungeun Park  
Michigan State University  
Aaron Mosier  
Michigan State University | Lesson Study in Undergraduate Calculus: What Can We Learn about Mathematical and Classroom Discourse from Lesson Study? (part II) |
Jennifer Kaplan  
Michigan State University

Friday 5:00 pm – 5:30 pm    Preliminary Reports

| University A | Gary Davis  
University of Massachusetts, Dartmouth  
Sigal Gottlieb  
University of Massachusetts, Dartmouth | Interactive Teaching and Computational Mathematics: Promoting Mathematical Conceptualization and Competency |
|--------------|-------------------------------------------------|
| University B | Ami Mamolo  
Simon Fraser University | How To Act? A Question about Encapsulating Infinity |
| University C | Natasha Speer  
University of Maine  
Karen King  
New York University | Examining Mathematical Knowledge for Teaching in Secondary and Post-Secondary Contexts |
| Congressional A | David Miller  
West Virginia University | Promoting Success in Applied College Algebra by Using Worked Examples in Supplemental Sessions |
| Congressional B | Luis Saldanha  
Arizona State University  
Pat Thompson  
Arizona State University | On Conceptualizing Probabilistic Experiments and Quantifying Expectation: Insights from Students’ Experiences in Designing Sampling Simulations |
| State A | Theresa Laurent  
Saint Louis College of Pharmacy | An Analysis of College Mathematics Departments’ Credit Granting Policies for Students with High School Calculus Experience |

Friday 6:00 pm – 7:30 pm    Dinner – State C

SATURDAY, MARCH 1

Saturday 7:30 am – 2:30 pm    Registration – Southeast Foyer
Saturday 7:30 am – 8:30 am    Continental Breakfast – State AB
### Saturday 8:30 am – 9:00 am  Contributed Reports

| University A | Rachael Kenney  
Purdue University | Pre-Calculus Students’ Interactions with Mathematical Symbols |
|--------------|-------------------------------|-------------------------------------------------------------|
| University B | Jane G. Walter  
Brigham Young University  
Erin Houghtaling  
Brigham Young University  
Hope Gerson  
Brigham Young University | The Influence of Risk Taking on Student Creation of Mathematical Meaning: Contextual Risk Theory (CRT) |
| University C | Chris Rasmussen  
San Diego State University  
Michelle Zandieh  
Arizona State University  
Megan Wawro  
San Diego State University  
Frances Henderson  
San Diego State University | How Do You Know Which Way the Arrows Go? The Emergence and Brokering of a Classroom Math Practice |

### Saturday 9:10 am – 9:40 am  Contributed Reports

| Congressional A | Craig Swinyard  
University of Portland | Finding a Suitable Alternative to a Potential Infinity Perspective: A Watershed Moment in the Reinvention of the Formal Definition of Limit |
| Congressional B | JenqJong Tsay  
University of Texas-Pan American  
Shandy Hauk  
University of Northern Colorado | Prospective Elementary Teachers’ Multiplication Schema for Fractions |
| State A | Jason K. Belnap  
Brigham Young University  
Michelle G. Withers  
Brigham Young University | Critical Experiences in Discussions Regarding Teaching: The case of graduate mathematics teaching assistants |
| University A | Allison Toney  
University of North Carolina, Wilmington | Women with Advanced Degrees in Mathematics in Doctoral Programs in Mathematics |
Saturday 9:50 am – 10:20 am  Contributed Reports

| University A | Jennifer Hall  
University of Ottawa | Women’s Mathematics Experiences that Influence the Pursuit of Undergraduate Mathematics Degrees |
| University B | Brian Fisher  
Pepperdine University | Exploring the Infinite Process Inherent in Multivariable Calculus |
| University C | Keith Weber  
Rutgers University | Mathematics Majors’ Evaluation of Mathematical Arguments and Their Conception of Proof |

Saturday 10:20 am – 10:50 am  Coffee Break – Outside AB
Saturday 10:50 am – 11:50 am  Plenary Stacey Bretz—State AB

Saturday 12:00 pm – 1:00 pm  Lunch  State C
Saturday 1:00 pm – 1:30 pm  Preliminary Reports

| University A | Iuliana Radu  
Rutgers University  
Keith Weber  
Rutgers University | Conceptual Changes in Mathematics Majors’ Understanding of Completed Infinite Iterative Processes |
| University B | Tyler Marghetis  
Concordia University | What Makes a Textbook Proof a Satisfactory Explanation for the Reader? |
| University C | David E. Brown  
Utah State University | (Self) Assessment: Aiding Awareness of Achievement |
| Congressional A | Erin Goodykoontz  
West Virginia University | Factors that Affect College Students’ Attitudes toward Mathematics |
| Congressional B | Hollylynne Stohl Lee  
North Carolina State University  
J Todd Lee  
Elon University  
Karen Allen Keene  
North Carolina State University  
Megan Early  
North Carolina State University  
Peter Ely  
North Carolina State University  
Krista Holstein  
North Carolina State University | Pedagogical Content Moves in an Inquiry-Oriented Differential Equations Class: Purposeful Decisions to Further Mathematical Discourse |
|---|---|
| State A | Kevin C. Moore  
Arizona State University | An Investigation into Precalculus Students’ Conceptions of Angle Measure |

**Saturday 1:40 pm – 2:10 pm  Contributed Reports**

| University A | Jose Campero  
Instituto Technologico Autonomo De Mexico  
Maria Trigueros  
Instituto Technologico Autonomo De Mexico | Teaching Dynamic Optimization, a Research Based Proposal and its Testing |
|---|---|
| University B | Ann Ryu Edwards  
University of Maryland  
Kellyn Farlow  
University of Maryland  
Senfeng Liang  
University of Maryland | Aspects of Proving in Group Problem-solving in an Undergraduate Calculus Classroom Context |
| University C | Ricardo Nemirovsky  
San Diego State University  
Charles Hohensey  
San Diego State University  
Ian Whitacre  
San Diego State University | The Student as Artist |
### Saturday 2:20 pm – 2:50 pm Contributed Reports

| Congressional A | Janet G. Walter  
|                 | Brigham Young University  
|                 | Janelle M. Hart  
|                 | Brigham Young University  
|                 | Hope Gerson  
|                 | Brigham Young University  
|                 | Student Motivations for Mathematical Understanding in an Inquiry-Based Calculus Classroom |

| Congressional B | Marilyn Carlson  
|                 | Arizona State University  
|                 | Michael Oehrtman  
|                 | Arizona State University  
|                 | Kevin Moore  
|                 | Arizona State University  
|                 | The Role of Quantitative Reasoning in Solving Applied Precalculus Problems |

| State A | Nadia Hardy  
|         | Concordia University  
|         | Students’ Perceptions of Institutional Practices: The Case of Limits of Functions in College Level Calculus Courses |

### Saturday 2:50 pm – 3:20 pm Coffee Break – Southwest Foyer

### Saturday 3:20 pm – 3:50 pm Preliminary Reports

| Congressional A | Yvonne Lai  
|                 | University of Michigan  
|                 | Marion Moore  
|                 | University of California, Davis  
|                 | Hillel Raz  
|                 | University of California, Davis  
|                 | Teaching Math Majors How to Teach |

| Congressional B | Jenq-Jong Tsay  
|                 | University of Texas-Pan American  
|                 | Shandy Hauk  
|                 | University of Northern Colorado  
|                 | Richard Grassl  
|                 | University of Northern Colorado  
|                 | Mark Davis  
|                 | University of Northern Colorado  
|                 | Teaching Proof by Mathematical Induction |

| University A | April Judd  
<p>|             | Function, Visualization, and |</p>
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<th>University B</th>
<th>University of Northern Colorado</th>
<th>Mathematical Thinking among College Students with Attention Deficit Hyperactivity Disorder</th>
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<td>University C</td>
<td>Pietro Paparella Michigan State University</td>
<td>A Dynamic Testing Approach for Undergraduate Mathematics Course Placement</td>
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<tr>
<td>University C</td>
<td>Tommy Smith University of Alabama, Donna Ware University of Alabama, Rachel Cochran University of Alabama, Melanie Shores University of Alabama,</td>
<td>Mathematical Investigations in Inquiry-Based Courses for Pre-Service Teachers</td>
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<tr>
<td>State A</td>
<td>Megan Wawro San Diego State University</td>
<td>Task Design: Towards Promoting a Geometric Conceptualization of Linear Transformation and Change of Basis</td>
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<tr>
<td>State B</td>
<td>Amanda Lambertus North Carolina State University</td>
<td>Recruiting, Supporting, and Graduating Women Mathematics Doctorates: Investigating the Community Elements of Successful Programs</td>
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Saturday 4:00 pm – 4:30 pm Preliminary Reports

| Congressional A | Joe Champion University of Northern Colorado | Self-Efficacy, Calibration, and Exam Performance in College Algebra and Calculus I |
| Congressional B | John C. Meyer University of Alabama Rachel D. Cochran University of Alabama Laura R. Stansell University of Alabama Heather A. Land University of Alabama William O. Bon University of Alabama Jason S. Fulmore | Incorporating Inquiry-Based Class Sessions with Computer Assisted Instruction |
| University A | Lorraine Dame  
University of Victoria  
Gary MacGillivray  
University of Victoria  
Michelle Edwards  
University of Victoria | The Relationship Between Missing Graded Course Work and Student Outcomes in Undergraduate Math Courses |
| University B | Lara Alcock  
Loughborough University | e-Proofs: Student Experience of Online Resources to Aid Understanding of Mathematical Proofs |
| University C | Jessica Munns  
Utah State University  
Brynja Kohler  
Utah State University | Effects of In-service and Pre-service Teacher Collaboration on Pre-service Teachers’ Undergraduate Education |
| State A | George Sweeney  
San Diego State University | Riding the Double Ferris Wheel: Students’ Creation and Interpretation of Trigonometric Functions in Realistic Settings |

**Plenary Panel on Collaborations of Mathematics Educators and Mathematicians**

- James Hamos, National Science Foundation
- Rebecca McGraw, University of Arizona
- Joe Wagner, Xavier University

**Saturday 6:00 pm – 8:00 pm**  
Dinner – On Your Own

**SUNDAY, MARCH 2**

- **Sunday 7:40 am – 8:40 am**  
Continental Breakfast – State AB

- **Sunday 8:40 am – 9:10 am**  
Contributed Reports
The Nature of Visualization and Its Impacts on the Teaching and Learning of the Notion of Continuity of Functions.

An Example of a Non-traditional Pedagogy in an Abstract Algebra Class: Was it Reform Teaching?

A Two Semester Observational Study of Teaching Practices and Interactions in Multi-Section Undergraduate Mathematics Courses

Participant’s Perceptions and Experiences with Worked-Out Examples in Calculus

Appropriating New Definitions: The Case of Lipschitz Functions

Impact of Professional Development on the Classroom Practices of Adjunct Faculty

An Investigation of One Instructor’s Mathematical Knowledge for Teaching: Developing a Preliminary
| University A | Jana Talley  
University of Oklahoma | Instructor Responses to Prior Knowledge Errors Made by Calculus Students |
|-------------|------------------------|-------------------------------------------------|
| Alumni      | Jean-Phillippe Drouhard  
Universite de Nice-Sophia Antipolis | Epistemography: How to Know What Students Know, and are Supposed to Know |
| University C | Kitty Roach  
University of Northern Colorado  
Bernadette Mendoza-Spencer  
University of Northern Colorado | Graduate Teaching Assistants Questioning Techniques |
| Governor’s Board Room | Danielle Champney  
University of California, Berkeley  
Aditya Adiredja  
University of California, Berkeley | Connecting Beliefs and Missed Opportunities: A Model for Graduate Student Instructors Reflection on Teaching |

Sunday 11:00 am – 11:30 am  Preliminary Reports

| University A | Ian Whitacre  
San Diego State University  
Susan D. Nickerson  
San Diego State University | Measuring Inquiry-Oriented Teaching in the Context of TA Professional Development |
|-------------|-------------------------|---------------------------------------------------------------|
| University B | Joy Whitenack  
Virginia Commonwealth University  
Laurie Cavey  
James Madison University  
Aimee Ellington  
Virginia Commonwealth University | The Instructor’s Important Role in Supporting Mathematical Arguments in a K-5 Mathematics Specialist Program |
| University C | Elise Lockwood  
Portland State University | Investigating Student Approaches to Counting Problems: An Exploration Using the Notion of Actor-Oriented Transfer |
|-------------|--------------------------|--------------------------------------------------------------------------------------------------|
| Alumni      | Rebekah Lane  
Florida A& M University | How Graphing Calculators and Visual Imagery Contribute to College Algebra Students’ Understanding the Concept of Function |
| Governor’s Board Room | Sarah Ives  
North Carolina State University | Preservice Secondary Mathematics Teachers’ Beliefs and Content Knowledge of Probability |