RCML

Conference 2011

38th Annual Conference
Hilton Cincinnati Netherland Plaza
Cincinnati, Ohio
March 10-12, 2011

Contents

Date	Start Time	End Time	Function	Room
3/10/2011	5:30 PM	9:00 PM	Hotel and RCML Registration	Lobby (L)
	6:30 PM	9:00 PM	Light Reception	Mezzanine (Mezzanine Level, ML)
3/11/2011	8:00 AM	5:30 PM	Hotel and RCML Registration	Lobby (L)
	8:30 AM	4:45 PM	Breakout	Boardroom 3 (ML)
	8:30 AM	4:45 PM	Breakout	Boardroom 4 (ML)
	8:30 AM	4:45 PM	Breakout	Rosewood (4th Floor)
	8:30 AM	4:45 PM	Breakout	Mayflower 1 (Lower Level, LL)
	8:30 AM	4:45 PM	Breakout	Mayflower 2 (LL)
	8:30 AM	4:45 PM	Breakout	Mayflower 3 (LL)
	8:30 AM	4:45 PM	Breakout	Salon B (4th Floor)
	8:30 AM	4:45 PM	Breakout	Salon C (4th Floor)
	12:30 PM	1:45 PM	Lunch & Business Meeting	Rue Reolon (Street Level, SL)
	5:00 PM	5:45 PM	Wilson Memorial Lecture	Rosewood (4th Floor)
3/12/2011	8:00 AM	10:00 AM	Hotel and RCML Registration	Lobby (L)
	8:30 AM	9:15 AM	Founder's Lecture	Rosewood (4th Floor)
	9:30 AM	12:15 PM	Breakout	Boardroom 3 (ML)
	9:30 AM	12:15 PM	Breakout	Boardroom 4 (ML)
	9:30 AM	12:15 PM	Breakout	Rue Reolon (SL)
	9:30 AM	12:15 PM	Breakout	Mayflower 1 (LL)
	9:30 AM	12:15 PM	Breakout	Mayflower 2 (LL)
	9:30 AM	12:15 PM	Breakout	Mayflower 3 (LL)
	9:30 AM	12:15 PM	Breakout	Salon B (4th Floor)
	9:30 AM	12:15 PM	Breakout	Salon C (4th Floor)
	12:15 PM	1:15 PM	Lunch	Rosewood (4th Floor)
	2:00 PM	4:30 PM	Executive Board Meeting	Belvedere (L)

Welcome

Welcome to the 38th RCML Annual Conference! We would like to thank the session presenters, RCML board, 2011 conference committee, and all that helped organize this year's conference.

We hope your stay is pleasant and the conference provides you with information and knowledge that will enhance your teaching. If our staff can be of any assistance during the conference, please contact Lynn Columba at (610) 349-0746 and Bob Drake at (513) 708-6977.

RCML Board

PRESIDENT, 2009-2011
Anne Reynolds
Kent State University
Kent, Ohio 44242
areynol5@kent.edu

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Kay A. Wohlhuter
University of Minnesota, Duluth
Duluth, MN
kwohlhut@d.umn.edu

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reeder@ou.edu

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289 Crestmont Cove
Cordova, TN 38018-6904
smaxwell@memphis.edu

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Sam Houston State University
Huntsville, Texas 77341
swarthout@shsu.edu

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Juliana Utley
Oklahoma State University
Stillwater, Oklahoma 74078
juliana.utley@okstate.edu

ARCHIVIST
William R. Speer
Office of the Dean
University of Nevada Las Vegas
Las Vegas, NV 89154
william.speer@unlv.edu

INVESTIGATIONS EDITOR
(Appointed)
Jean Schmittau
SUNY - Binghamton
Binghamton, NY 13902
jschmitt@binghamton.edu

INTERSECTIONS EDITOR
(Appointed)
Elaine Young
Texas A&M University
-Corpus Christi
Corpus Christi, TX 78412
elaine.young@tamucc.edu

MEMBERSHIP CHAIRMAN
(Appointed)
Dr. Mary B. Swarthout
Sam Houston State University
Math and Statistics Dept.,
P.O. Box 2206
Huntsville, TX 77341-2206
swarthout@shsu.edu

WEBMASTER (Appointed)
Ryan Speer
Perrysburg, Ohio
rspeer@sbcglobal.net

Conference Committee

Kerri Richardson (2009-2012)
University of North Carolina at Greensboro
kerri_richardson@uncg.edu

Elaine Young (2009-2012)
Texas A & M University, Corpus Christi
Elaine.Young@tamucc.edu

Megan Che (2010-2011)
Clemson University
Clemson, South Carolina
sche@clemson.edu

Mikhail Turegun (2010-2011)
Oklahoma City Community College
Oklahoma City, Oklahoma
mturegun@ou.edu

Eileen Faulkenberry (2010-2013)
Texas A&M University, Commerce
Eileen_Faulkenberry@tamu-commerce.edu

Gabriel Matney (2010-2013)
University of Arkansas at Forth Smith
gmatney@uafortsmith.edu

Conference Chair
Bob M. Drake
University of Cincinnati
bob.drake@uc.edu

Program Chair
Lynn Columba
Lehigh University
Lynn.columba@gmail.com

Schedule of Events

All sessions will be held at the Hilton Cincinnati Netherland Plaza.

Thursday, March 10, 2011

Registration (Lobby, L)	5:30 pm - 9:00 pm
Reception (Mezzanine, ML)	6:30 pm – 9:00 pm

Friday, March 11, 2011

Registration (Lobby, L)	8:00 am - 5:30 pm
Sessions 1-8	8:30 am - 9:15 am
Sessions 9-16	9:30 am - 10:15 am
Sessions 17-24	10:30 am - 11:15 am
Sessions 25-32	11:30 am -12:15 pm
Lunch & Business Meeting (Rue Reolon, SL)	12:30 pm – 1:45 pm
Sessions 33-40	2:00 pm - 2:45 pm
Sessions 41-48	3:00 pm - 3:45 pm
Sessions 49-56	4:00 pm - 4:45 pm
Wilson Memorial Lecture (Rosewood, 4th Floor)	5:00 pm - 5:45 pm
Dinner (On your own)	

Saturday, March 12, 2011

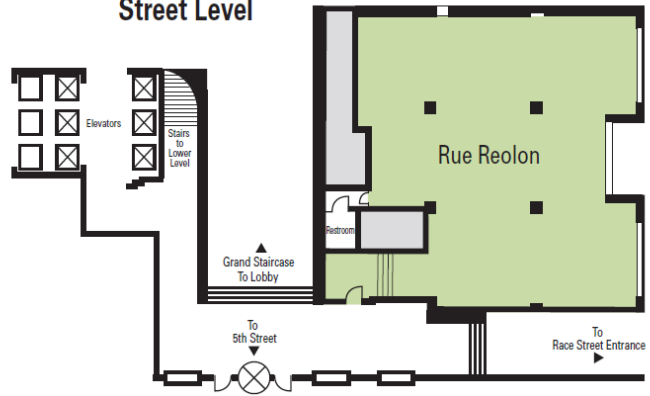|	
Registration (Lobby, L)	8:00 am - 10:00 am
Founder's Lecture (Rosewood, 4th Floor)	8:30 am - 9:15 am
Sessions 57-64	9:30 am - 10:15 am
Sessions 65-72	10:30 am - 11:15 am
Sessions 73-80	11:30 am - 12:15 pm
Lunch (Rosewood, 4th Floor)	12:15 pm – 1:15 pm
Executive Board Meeting (Belvedere, L*)	2:00 pm - 4:30 pm

* Belvedere is located at the back of the Orchid's restaurant near the Lobby area.
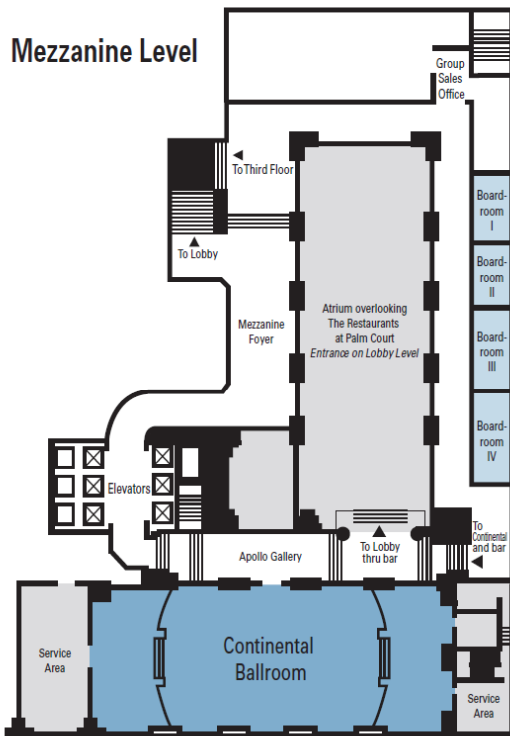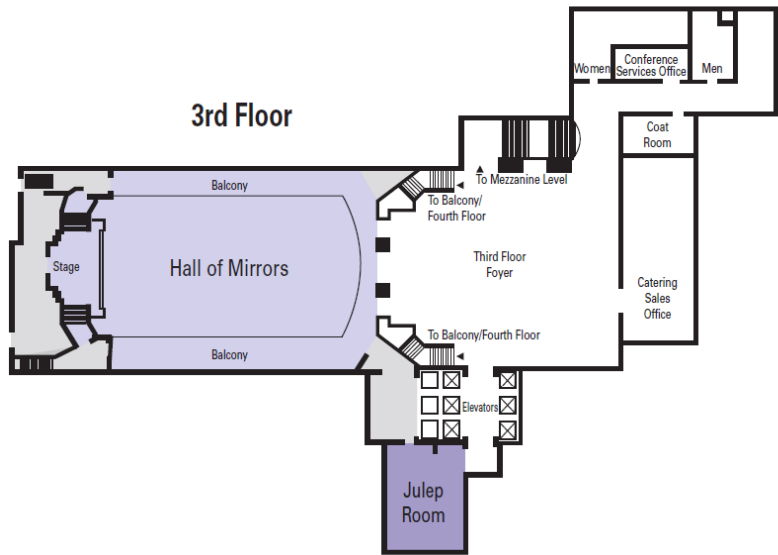
Hotel Floor Plan

Lower Level

Service Area

Mayflower 1

Mayflower 2

Mayflower 3

Service Area

Service Area

Men

Service Area

Foyer Entrance

Coat Room

Women

Foyer

Elevators

To Valet

Street Level

Elevators

Stairs to Lower Level

Rue Reolon

Restroom

Grand Staircase To Lobby

To 5th Street

To Race Street Entrance

Mezzanine Level

Group Sales Office

To Third Floor

To Lobby

Board-room I

Board-room II

Board-room III

Board-room IV

Mezzanine Foyer

Atrium overlooking The Restaurants at Palm Court
Entrance on Lobby Level

Elevators

Apollo Gallery

To Lobby thru bar

To Continental and bar

Service Area

Continental Ballroom

Service Area

3rd Floor

Women

Conference Services Office

Men

Coat Room

To Mezzanine Level

Balcony

Stage

Hall of Mirrors

To Balcony/ Fourth Floor

Third Floor Foyer

Catering Sales Office

To Balcony/Fourth Floor

Balcony

Elevators

Julep Room

4th Floor

Rosewood

Freight Elevator

Rosewood Foyer

Women

Pavillion Ballroom

Hall of Mirrors
Main Entrance on Third Floor
Balcony Entrance on Fourth Floor

To Third Floor

Fourth Floor Foyer

To Third Floor

Registration

Caprice

1   4

Rookwood

Salon M

Business Center

Banquet Office

Elevators

Men

2   3

Hall of Nations

Salon I

Salon H

Salon G

Salon F

Salon E

Salon D

Salon C

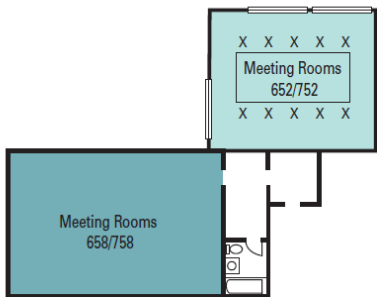Salon B

Salon A

Meeting Rooms

Meeting Rooms 652/752

Meeting Rooms 658/758

Keynote Speakers

Wilson Memorial Lecture:

Linda Sheffield (sheffield@nku.edu), Ph.D., Regents Professor Emerita of Mathematics Education at Northern Kentucky University, is a co-author of *Math Innovations*, a middle grades mathematics series as well as the Javits-funded *Project M³: Mentoring Mathematical Minds* and the NSF *Project M²: Mentoring Young Mathematicians,* two series of units for elementary and primary students. She a leader of the NAGC STEM SIG, the NCSM SIG on Mathematically Promising, was chair of the NCTM Task Force on Promising Students, and is past president of the School Science and Mathematics Association. Among the approximately 50 books that she has authored, co-authored, or edited are *The Peak in the Middle*; *Extending the Challenge in Mathematics; Awesome Math Problems for Creative Thinking;* the PreK–2 NCTM *Navigations* series; and a math methods book for elementary and middle school teachers. She has conducted seminars for educators, parents and students across the United States and in nearly twenty other countries with an emphasis on helping students develop their mathematical creativity, promise, talents and abilities to the fullest extent possible.

The title of Professor Sheffield's keynote address is "**Race to the Top with the Next Generation of STEM Innovators**." Science, Technology, Engineering, and Mathematics (STEM) are critical to our economy, national security, and global leadership in innovation and research. *Preparing the Next Generation of STEM Innovators: Identifying and Developing our Nation's Human Capital,* the newly released report from the National Science Board, has several recommendations for research and policy actions. Additional alarming reports such as Harvard's Program on Education Policy report, *U.S. Math Performance in Global Perspective*, the National Academy of Sciences report*, Rising Above the Gathering Storm Revisited,* and national initiatives such as the *Race to the Top* grants and the *Common Core State Standards* also have major implications for research into mathematics curriculum, assessment and instructional practices to identify, develop and support high-performing students. Some of these are reflected in the new NCTM/NAGC/NMSA book, *The Peak in the Middle: Developing Mathematically Gifted Students in the Middle Grades,* noting that the middle grades are a crucial time for capturing the interest and imagination and developing the potential of mathematically promising students. Too often, in the United States, unlike in many of the highest achieving countries, these students go unrecognized, unmotivated, and under-developed at a time when they are most vital to the future of our country. Join us for an overview of these reports and a discussion of critically needed development and dissemination of research to prepare the STEM leaders of tomorrow.

"Leadership tomorrow depends on how we educate our students today, especially in math, science, technology, and engineering."
--Barack Obama, January 6, 2010

Keynote Speakers

Founder's Lecture:

William R. Speer (william.speer@unlv.edu), Ph.D., currently serves as Dean of the College of Education at the University of Nevada Las Vegas. He is also a Professor of Mathematics Education and the Director of the COS/COE Center for Science and Mathematics Education. He is also a Professor Emeritus from Bowling Green State University. Speer is a Past President of several professional organizations at the state and national levels, including the Research Council on Mathematics Learning and the School Science and Mathematics Association. He is presently a member of the Board of Directors of WestEd and has served as a member of the Board of Directors for the Triangle Coalition in addition to serving on the Mathematics and Statistics Advisory Committee for the CollegeBoard. He was also a member of the NCTM *Professional Standards for Teaching Mathematics* Commission and was chosen as a major author of the revised standards released in 2007. He is presently Chairman of the Board of the NCTM Mathematics Education Trust and the General Editor for the NCTM annual yearbooks covering 2011-13. His research interests are in diagnosis and assessment and the relationship of college readiness measures and transition to credit-bearing mathematics coursework. He has spoken in 30+ countries and his work has been published in national and international journals and is reflected in the twelfth edition of the Wiley text, *Today's Mathematics: Concepts, Classroom Methods and Instructional Activities*, which he co-authors with fellow RCML members, James Heddens and Daniel Brahier.

Professor Speer's keynote present at RCML 2011 is entitled "**The Nature and the Roles of Desirable Difficulties in Mathematics Teaching and Learning**." This session will explore the research foundation and the basic principles of the development of instructional and assessment strategies that enable students to engage in deeper reasoning and mathematical discourse about mathematical ideas. The session will help in understanding how mathematical ideas interconnect and build on one another to produce a coherent knowledge base which encourages recognition and application of mathematics to solve rich problems. Sometimes learners express a reluctance to look at mathematics in an alternative way to their initial exposure to the topic. Pleas of "You're going to confuse me!" may actually signal an unrecognized confusion that is ALREADY present. There are many benefits to be gained by creating DESIRABLE DIFFICULTIES designed to encourage thinking about mathematics as well as enhancing both long-term retention and transfer. Out of apparent chaos and confusion emerges a deeper understanding and appreciation.

Thursday, March 10, 2011

Registration (Lobby, L)   5:30 pm - 9:00 pm

Reception (Mezzanine, ML)   6:30 pm – 9:00 pm

Friday, March 11, 2011

Registration (Lobby, L)   8:00 am - 5:30 pm

8:30 a.m.—9:15 a.m.   Friday, March 11, 2011   Sessions 1—2

Session 1   Boardroom 3 (ML)

Title: What Are Undergraduates Looking For in a Methods Experience?
Presented by: Daniel Brahier , Bowling Green State University
Abstract:
Students in methods and pre-methods education courses were surveyed to examine whether there is a difference in expectations of the course as students gain more experience. The survey is in a pilot stage, and implications of the results will be discussed. In addition, we will discuss some of the results of a broad program audit of the Secondary Mathematics Program at Bowling Green State University conducted in the Spring of 2010. The audit consisted of surveys, individual, and group interviews, exploring what students find most valuable in a mathematics education program, particularly in methods courses.

Session 2   Boardroom 4 (ML)

Title: Fraction Models: Eggs over Easy
Presented by: Elaine Young & Sarah Ives, Texas A&M University-Corpus Christi
Abstract:
Data collected over seven semesters from 329 preservice teachers enrolled in a mathematics content course identified a helpful model for fractions. Constant comparative methodology (Glaser & Strauss, 1967) analyzed responses to reflective prompts given at the end of each course. Preservice teachers were asked to identify the most important mathematical concept they learned and which activity was most helpful. The egg carton model provides a bridge across concrete, visual, and abstract representation for fractions. This discrete model sparks curiosity and encourages engagement with bright colors and a non-threatening atmosphere ("Easter eggs! What are we doing? I want purple!").
References
Glaser, B. G. & Strauss, A. L. (1967). *The discovery of grounded theory: strategies for qualitative research*. New York: Aldine Transaction.

Session 3   Rosewood (4th Floor)

Title: How Metaphors Affect Mathematical Problem Solving
Presented by: Sean Yee, Kent State University
Abstract:
Mathematical problem solving relies heavily on the interpretation of the problem. Metaphors are deeply embedded within this interpretation and influence how students approach a problem, devise a strategy, and interpret their results. In this presentation, teachers and researchers will learn the subtleties of metaphors in posing and solving mathematical problems. My research offers insight into understanding the breakdown between student's ability to solve problems and the teacher's ability to solve problems. Specifically, how do teachers tell if the student's problem solving ability is genuine? What metaphors are appropriate for improving student's understanding of various mathematical problems?

Session 4   Mayflower 1 (LL)

Title: Creating Critical Connections in Mathematics and Science through Engineering (C3MSE)
Presented by: Stacy Reeder & Timothy A. Laubach, University of Oklahoma
Abstract:
The innovative features of a Mathematics and Science Partnership (MSP) grant project where mathematics and science were integrated through the field of engineering will be shared. Forty-seven middle school mathematics and science teachers participated in a ten-day summer institute and in four follow-up sessions during the subsequent school year. The summer institute was structured into two components: engineering investigations in laboratories with engineers and pedagogy experiences in classrooms with mathematics and science educators. We will also highlight a few of the authentic, guided inquiry lessons implemented throughout the project along with resources used to develop this project.

Session 5   Mayflower 2 (LL)

Title: Slicing a Cube: A Geometry Investigation Across Many Levels
Presented by: Angela Krebs, University of Michigan—Dearborn
Abstract:
Many teachers do not have a deep conceptual understanding of geometry nor do they feel confident in their understanding. As a result, they often teach in a very directed way, if at all. If children are to learn geometry in a meaningful way then their teachers must first build their own deep understanding. This session will investigate one geometry problem that the author has used across different levels of audiences, middle school children, pre-service elementary and middle grades teachers, and in-service secondary teachers. In all instances the problem deepened participants' and students' geometrical understanding.

Session 6   Mayflower 3 (LL)

Title: Individual Differences in Magnitude-based Fraction Representations
Presented by: Thomas J. Faulkenberry, Texas A&M University – Commerce
Abstract:
The numerical distance effect (NDE) is a robust effect in mathematical cognition that describes a negative correlation of the numerical distance between two numbers and the time it takes to choose the larger number. The presence of this effect is commonly taken as evidence for a person's tendency to represent numbers conceptually on a mental number line. In the current research, I investigated the influence of individual differences on the size of the NDE in a simple fraction comparison task. The data and their implications will be discussed in light of current understanding of mental fraction representations.

Session 7   Salon B (4th Floor)

Title: Working Together: Student Engagement in a Middle School Mathematics Classroom
Presented by: Cathleen Rossman, Rutgers University
Abstract:
Students may benefit from working in small groups when each individual is engaged, at least to some extent, during the problem solving session. This session will focus on the types of engagement that emerge as a group of middle school students work on a conceptually challenging mathematics problem. The students' engagement and work will be discussed with respect to cognition and affect, both critical to a student's mathematical success. Classroom examples will be provided, including student explanations of their mathematical ideas and reasoning, as well as questionnaire responses regarding student interactions and engagement.

Session 8   Salon C (4th Floor)

Title: Mathematical Transformation through Social Understanding: A Case Study of a Social Issue Mathematics Course for Preservice Teachers
Presented by: Summer Bateiha, Western Kentucky University
Abstract:
Throughout history, educators have suggested that ensuring social well-being should be education's primary goal. However, many scholars question whether all subject areas are inviting students to contemplate critical world conditions. In light of my own concerns about developing social well-being through my teaching, I decided to explore elementary preservice teachers' perceptions about teaching and learning in a mathematics content course that integrated critical social issues and mathematics. In this session, I present findings which suggest that participating in this study transformed most of the students' understandings of both mathematics and social issues.

Session 9   Boardroom 3 (ML)

Title: Mathematical Discourse Embedded in Stories: A Powerful Tool to Teach Complex Concepts in Math
Presented by: Lynn Columba, Lehigh University
Abstract:
Shared storybook reading offers a unique opportunity for increasing "math talk" in a way that is consistent with the natural routines typically found in preschool classrooms. Yet, little attention has been directed toward using shared storybook reading as a means of increasing "math talk" despite the logical connection (e.g. Hong, 1996; Hong, 1999; Jennings, Jennings, Richey, & Dison-Kraus, 1992; Young-Loveridge, 2004). Thus, the purpose of this individual session is to present a study investigating the effect of training teachers to embed "math talk" in shared storybook reading. Specifically, initial results related to the effect of training on the frequency, content, and complexity of teacher "math talk" during shared storybook reading will be reviewed.

Session 10   Boardroom 4 (ML)

Title: Comparing the Use of Vectors in Trigonometry and Physics Drawings
Presented by: Wendy James, Oklahoma State University
Abstract:
This project serves as one part of a larger project investigating a viable reason why students struggle applying their vector knowledge from a trigonometry course to a physics course based on a different set of assumptions than traditionally used. Rather than using transfer theory, which is rooted in the assumption that students acquire knowledge, this project uses literacy theory, which is rooted in the assumptions that students construct their understanding and that mathematics itself is multi-faceted literacies. A comparison of how vectors are used in drawings during instruction is provided.

Session 11   Rosewood (4th Floor)

Title: The Good, the better, and the ugly: Three ways that math is taught in middle school
Presented by: Justin Fletcher & Darlinda Cassel, University of Central Oklahoma
Abstract:
Field experiences lead to noticeable differences in classroom environments, teaching styles, expectations, and students' behavior and many personal questions. In this session, we will discuss observations of three different middle school mathematics teachers' style of teaching and how that promoted or did not promote mathematical learning.

9:30 a.m.—10:15 a.m.   Friday, March 11, 2011   Sessions 12—14

Session 12   Mayflower 1 (LL)

Title: Factoring Quadratic Polynomials: An Alternative Approach
Presented by: James Dogbey, Gladis Kersaint, & John Gyening, Clemson University
Abstract:
Quadratic polynomials are one of the most frequently used polynomial functions in school mathematics due to their ability to solve numerous real world problems. The conventional methods for factorizing quadratic expressions and solving quadratic equations - factoring, completing of squares, graphing, and quadratic formula, while having some strengths also have some weaknesses that make them difficult and unfeasible to teach this concept at lower grade levels. In this paper, we present an alternative method for factoring quadratic expressions and solving quadratic equations: The d-g (Discriminant – Greatest Common Factor) Method. The proof of the formula is given and illustrative examples using the formula are presented.

Session 13   Mayflower 2 (LL)

Title: Write is Right: Students Using Graphic Organizers to Improve Their Problem-Solving Skills and Abilities
Presented by: Alan Zollman, Northern Illinois University
Abstract:
This alternative to standard four-step problem solving uses graphic organizers to give teachers quick, efficient diagnoses of students' individual abilities and a comfortable, familiar method to facilitate instruction. Using graphic organizers with students is a novel approach to mathematical problem solving derived from research on reading and writing pedagogy. Allowing students to first use their own thinking (then reflect, revise, and re-organize their knowledge, strategies, and communication) helps them to improve their problem solving abilities. Our results coincide with known problem-solving findings; teaching via problem solving is the key instructional process.

Session 14   Mayflower 3 (LL)

Title: Mathematics Education: Learning from our Colleagues in India
Presented by: Kay A. Wohlhuter, University of Minnesota Duluth
Abstract:
This session will share the adventures and the results of being part of a mathematics education delegation to India. While meeting with mathematics educators and visiting their schools, delegation members will discuss mathematics teacher preparation, mathematics literacy for all, mathematics content for the future at elementary, middle, and secondary levels, and teaching mathematics with technology. By striving to understand the similarities and differences in mathematics education in the United States and in India, we can better serve our professional community.

Session 15   Salon B (4th Floor)

Title: Altering Emphasis: Changing Practices
Presented by: Bob M. Drake, University of Cincinnati
Abstract:
Despite decades of research on mathematics teaching and learning, many classrooms still utilize ineffective instructional approaches. This study examines the essentials for effectively changing the mathematics culture within individual schools and within a district to shift the instructional focus from procedural knowledge to mathematical understanding and problem solving. This presentation outlines key components necessary for changing the instructional approach used by "traditional" teachers, and describes a three year process in which all schools in a small low-income Midwestern district implemented changes.

Session 16   Salon C (4th Floor)

Title: Effects of the Use of a Multi-Step Warm-up Problem on Mathematics Learning, Grades 6-8 and the Teachers
Presented by: Ann R. Crawford, retired UNC-Wilmington & Cynthia F. Copolo, Curriculum and Instruction Consultant
Abstract:
This ten-week comparison study investigated effects of incorporating reading strategies within a high cognitive demand warm-up on student learning. Teachers opened class 3-5 days a week with a problem solving warm-up including three questions to focus on comprehending the problem. Every two weeks, teachers met to discuss implementation and methods for writing high level problems. Sample warm-up problems will be shared along with comparison results from an open ended problem assessment and multiple choice word-problem post-test.   Discussion will include impact on teachers' ability to write high level problems, their attitudes toward high level mathematics and implications for further research.

Session 17   Boardroom 3 (ML)

Title: The Influence of "Quick Draw" on Pre-service Teachers Spatial and Geometric Thinking
Presented by: Adele Hanlon, Jacksonville University
Abstract:
Spatial thinking plays an integral role in the success of students in the fields of science, technology, engineering, and mathematics. Despite the pervasiveness of spatial thinking, its value tends to be unrecognized in the educational system. Emphasis on spatial thinking skills and strategies should begin in the elementary classroom. This embedded quasi-experimental mixed methods study investigated pre-service elementary teachers and illustrated how the "Quick Draw" activity was shown to increase pre-service elementary teachers general awareness of spatial thinking thus creating the catalyst to instigate the inception of spatial thinking into their elementary classrooms.

Session 18   Boardroom 4 (ML)

Title: Understanding the Lived Experiences of Non-credit College Mathematics Students
Presented by: Mary Harper & Stacy Reeder, University of Oklahoma
Abstract:
This study investigated the K-12 experiences of students enrolled in non-credit college mathematics courses. In particular, what are experiences that shaped: perceptions and attitudes about mathematics; epistemological beliefs about the learning of mathematics; and the need to take a non-credit college mathematics course. Additionally, the role that mathematics played in career and educational decisions were examined. In-depth interviews were utilized to illuminate what students experienced in a manner that shows how the meanings (or their perspectives) of those experiences influenced their choices. A detailed analysis of the students' responses is presented to reveal emerging themes.

Session 19   Rosewood (4th Floor)

Title: Investigating Math Curricula for Student Centered Learning
Presented by: Betty Eaton & Darlinda Cassel, University of Central Oklahoma
Abstract:
Since the Russians sent Sputnik into orbit, Americans have been obsessed with improving students' math skills. A plethora of mathematics curricula have been developed to meet this need. Yet, there exists a wide disparity of thought concerning what elements are most crucial in accomplishing this feat. While basic computational skills are important, today's technological ever changing world requires problem solving abilities, and a depth of mathematical understanding that is often missing. What basic elements are being included in current prominent mathematics curricula? How do these elements line up with a student centered approach to learning?

Session 20   Mayflower 1 (LL)

Title: Geometry: What High School Mathematics Teachers Believe about Teaching it
Presented by: Brenda Strassfeld, Touro College
Abstract:
This paper reports the results of the analysis of the open-ended responses on the questionnaire of a study that examined 520 high school mathematics teachers' beliefs about geometry and its teaching with respect to its role in the curriculum, the uses of manipulatives and dynamic geometry software in the classroom, and the role of proof. The findings reveal a disconnect between some high school teachers' beliefs about why geometry is important to study and the current position of the Standards Movement; and between whether geometry should be taught as part of an integrated curriculum or as a one-year course.

Session 21   Mayflower 2 (LL)

Title: Fated, over-looked, disregarded : Nevermore! Middle School African American Math Students
Presented by: Tamora Jackson& Angiline Powell, The University of Memphis
Abstract:
This literature review examined African American middle school students' mathematics education. We explored effective pedagogies, teaching practices, curricula and learning environments that increase mathematics achievement for these students. Furthermore, this presentation examined research on culturally responsive practices in the mathematics classroom. As a result, the problematic disparity of academic achievement for these students were discovered and found to not only affect them but, their teachers, families, and society as well.

Session 22   Mayflower 3 (LL)

Title: The Effects of Concept Images and Concept Definitions on the Quadrilateral Understanding of K – 8 Pre-service Teachers
Presented by: Darlene E. Kohrman, Kalamazoo Valley Community College/Michigan State University
Abstract:
In this work in progress, Vinner's model of concept image and concept definition is used to collect data from pre-service teachers identified as possessing van Hiele Level One understanding. Using tasks adapted from the Q-level framework of Fujita and Jones, this study proposes to analyze how the concept images and concept definitions for certain quadrilaterals held by these pre-service teachers affects their ability to do tasks of classification and property justification. The study hopes to identify implicit properties held by this population that are not evident from looking only at their concept images and concept definitions.

Session 23   Salon B (4th Floor)

Title: Better Mathematics through Literacy: Building Bridges to Meaningful Learning
Presented by: Timothy McKeny, Ohio University
Abstract:
For the past four years, the Better Mathematics through Literacy program has been a professional development opportunity for inservice early childhood teachers in a small section of Appalachia to experience, examine, and implement ways of teaching mathematics to young children through engaging, learner-centered activities, the use of NCTM Process Standards, and through the literary devices of writing, reading, and communicating. Evidence of meaningful student learning, and the personal and professional growth of teachers will be shared to highlight this project's impact on student achievement and on teacher and student disposition toward early childhood mathematics.

Session 24   Salon C (4th Floor)

Title: Extending to Symbols
Presented by: Carol Livingston, University of Mississippi
Abstract:
Most students eventually replace modeling and counting strategies with number sense strategies. However, the ability to move fluidly from the concreteness of elementary concepts to the symbolic abstraction of algebra is often a hurdle not only for students, but for their teachers as well. This research is designed to assist secondary teachers and preservice teachers to develop a greater appreciation for elementary math curriculum, highlight concepts which can be revisited as many of the standard concepts of algebra are introduced.

11:30 a.m.—12:15 p.m.   Friday, March 11, 2011   Sessions 25—27

Session 25   Boardroom 3 (ML)

Title: Supporting Teachers as They Create Multiple-Choice Assessment Items and Use Assessment Data for Planning Instruction
Presented by: Sue Brown, University of Houston-Clear Lake
Abstract:
During this session, participants will create assessment items and will review teacher assessment portfolios noting pre/post test data and discussions as well as activities used with students. The data for this study were collected from teachers who participated in a two-year externally funded grant. Teachers created measurement tests and each teacher administered the test prior to teaching the measurement unit and based on data from the test, instructional decisions were made.   At the end of the unit, the same test was used as a posttest. A discussion of the results of this project will be shared with participants.

Session 26   Boardroom 4 (ML)

Title: The Zone of Optimal Learning: Building More Effective On-Line Learning Objects in an Age of Information Overload
Presented by: Michael Todd Edwards & Suzanne Rushton Harper, Miami University
Abstract:
In this talk, we introduce the notion of the "Zone of Optimal Teaching and Learning" - a theoretical model that considers student interactions with information along two dimensions, namely (1) data source and (2) information load. Through observations of classroom teachers and their students, we posit that optimal teaching and learning occurs when information load is neither too high nor two low; and when source data is balanced in a collaborative manner between internal and external sources (i.e., the underlying mathematics associated with the task is reasonably well-known. The student is familiar with prerequisite knowledge needed to solve the task and consults outside resources to confirm approaches or to verify solutions). We discuss implications of the model in the design of various curricular materials, with emphasis on on-line learning objects (e.g., java applets constructed with dynamic geometry software).

Session 27   Rosewood (4th Floor)

Title: Representations of Fifth Grade Students: A Look into the Development of Early Algebra Concepts
Presented by: Kerri Richardson, University of North Carolina at Greensboro & Darlinda Cassel, University of Central Oklahoma
Abstract:
This discussion centers around the types of algebraic representations found among 2 fifth grade classrooms completing similar pattern finding tasks. Close attention will be given to the characteristics of the representations and how students used them to generalize and justify a rule. The Framework used for analyzing the task comes from Lannin's (2005) approaches to generalizing patterns.

Session 28   Mayflower 1 (LL)

Title: Increasing Elementary Preservice Teachers' Mathematical Content Knowledge & Habits of Mind with Math Olympiads
Presented by: Jane M. Wilburne, Penn State University & M. Lynn Breyfogle, Bucknell University
Abstract:
Math Olympiad for Elementary and Middle School (MOEMS) problems are geared for students in grades 4-6 and 7-8. They are designed to increase students' flexibility with problem-solving, introduce them to mathematical concepts, foster their mathematical creativity and ingenuity, and provide them with satisfaction in solving mathematical problems. These problems were purposely used with preservice elementary teachers in elementary mathematics content courses at two universities. The study results show the effectiveness of using of MOEMS problems to enhance elementary preservice teachers' knowledge of content, problem-solving strategies, and their understanding of various habits of mind necessary to solve such problems.

Session 29   Mayflower 2 (LL)

Title: Impact of instruction on prospective elementary teachers' self-efficacy to teach fraction concepts
Presented by: Valerie Sharon & Teresa Hughes, Sam Houston State University
Abstract:
As novice teacher educators, the primary researchers in this study embarked on a journey to develop and improve upon a lesson on fraction concepts for prospective elementary teachers. The specific learning goal selected for our students was efficacy to teach fraction concepts at the elementary level as measured by a modified version of the MTEBI. We propose to share the results from the first cycle of our lesson study in terms of its impact on prospective elementary teachers' self-efficacy to teach fraction concepts as well as the lesson we, as math methods instructors, learned while engaged in lesson study.

Session 30   Mayflower 3 (LL)

Title: Relationship between Pre-Service Elementary Teachers Mathematical Learning Experiences and their Belief about Mathematics
Presented by: Juliana Utley, Adrienne Redmond, & Cynthia Ornona, Oklahoma State University
Abstract:
Pre-service elementary teachers' mathematical learning experiences provide a lens through which their beliefs about mathematics and the teaching of mathematics are shaped. In this session, we will a) share the mathematical learning experiences that pre-service elementary teachers believe had a significant impact on them as a learner of mathematics and b) explore the relationship between the mathematical learning experiences and pre-service elementary teachers' belief about the nature of mathematics.

11:30 a.m.—12:15 p.m.   **Friday, March 11, 2011**   **Sessions 31—32**

Session 31   Salon B (4th Floor)

Title: Base Ten Blocks in Elementary School Education
Presented by: Gary Christie, Baldwin-Wallace College
Abstract:
Research shows that children learn mathematics best by exploring it in a concrete manner first and constructing the mathematical concepts before representing the mathematics abstractly. This presentation will show elementary classroom teachers how to incorporate this approach through the use of base ten blocks when teaching multi-digit addition, subtraction, multiplication, and division of whole numbers and decimal fractions.

Session 32   Salon C (4th Floor)

Title: Mathematics Knowledge for Teaching: Some Pragmatics
Presented by: Edward Wall, The City College of New York
Abstract:
The scholarship clustered around ways of thinking that presumably aid a teacher in making mathematics subject matter comprehensible—for instance, discussions around teaching for understanding—is vast. In this essay, focusing on a subset of such scholarship, I look, taking serious the notion of mathematics knowledge for teaching, at what is entailed in the teacherly act of knowledgeably weaving together such mathematics content—issues of children's mathematics development and mathematics pedagogy though critical to such weaving are momentarily backgrounded—into a prehensible and productive mathematics task, something that has pattern, purpose, and shape.

12:30 p.m.—1:45 p.m.   **Friday, March 11, 2011**

Rue Reolon (SL)

Luncheon and Business Meeting

2:00 p.m.—2:45 p.m.   Friday, March 11, 2011   Sessions 33—35

Session 33   Boardroom 3 (ML)

Title: The Evolution of a High School Mathematics Teacher Community and its Impact on Instruction
Presented by: Michael Mikusa, Joanne Caniglia, & Sarah Koebley, Kent State University
Abstract:
The purpose of this study is to examine the evolution of a mathematics teacher community in an urban high school where all mathematics teachers participate in targeted professional development. Two existing models, the Yale-New Haven Teacher Institute and Boston University's Focus on Mathematics guide our professional development.   Mixed methods approaches will be used to investigate   how teacher communities change and how they impact on student learning. Data are collected from classroom observations; large and small group meeting transcripts; and surveys of content-pedagogical knowledge. In addition, we will gather quantitative data regarding student learning via standardized tests and common assessments.

Session 34   Boardroom 4 (ML)

Title: Tasks and Tools that Promote Reasoning and Sense Making in Introduction to Statistics
Presented by: Jeremy F. Strayer, Indiana State University
Abstract:
How does using the ALEKS intelligent tutoring system for homework affect the learning environment of an introduction to statistics classroom? That is the research question addressed by this session. Using the mathematical tasks framework, a focus on reasoning and sense making, and learning environments research, this session addresses the factors that influence student learning in the classroom.

Session 35   Rosewood (4th Floor)

Title: An analysis of thinking skills on Algebra I End-of-Course tests
Presented by: Tony Thompson, East Carolina University
Abstract:
This presentation will discuss research on one state's effort to incorporate higher-order thinking on its Algebra I End-of-Course tests developed between 1998-2007. To facilitate the inclusion of higher-order thinking, the state used a modified version of "Dimensions of Thinking." An analysis of Algebra I test items found that the state's initial interpretation and application of "Dimensions of Thinking" was faulty and inconsistent; as a result, few Algebra I test items from 1998- 2003 were found to assess higher-order thinking. Algebra I test items written in 2006-2007 were found to be more cognitively complex.

Session 36   Mayflower 1 (LL)

Title: The impact of multicultural games of chance on undergraduate students' understanding of probability
Presented by: Nirmala Naresh & Iris DeLoach Johnson, Miami University
Abstract:
Drawing from the theoretical fields of multicultural mathematics education and probability, we devised a study that investigated undergraduate students' understanding of probability. In this session we will share findings related to the following question: If and in what ways did participants' investigations of multicultural games of chance foster their understanding of probability? We hope that participants will leave the session with content and pedagogical tools they could use in their content or methods courses and develop an increased awareness of the need to integrate probability with context and culture.

Session 37   Mayflower 2 (LL)

Title: How Students of Diverse Abilities Solve Mathematics Problems
Presented by: Delinda van Garderen-Anderson, University of Missouri; Christa Jackson, University of Kentucky; & Amy Scheuermann, Minnesota State University
Abstract:
Many students with disabilities struggle in mathematics, resulting in lower performance and little, if any, annual progress (e.g., Cawley, et al., 2001). The concern, then, is how best to help them. This session will present the findings of a study that examined how students of diverse abilities used diagrams to solve mathematics word problems. Difficulties students experienced when using diagrams to solve the problems will be identified and implications for instruction will also be discussed.

Session 38   Mayflower 3 (LL)

Title: A Conceptual Approach to Transformations of Functions
Presented by: Eileen Durand Faulkenberry, Texas A&M University-Commerce
Abstract:
Transformations of functions is a topic that is often taught by memorizing rules. This talk will examine a conceptual approach to teaching transformations of functions and how this approach impacts the students' understanding of transformations.

Session 39   Salon B (4th Floor)

Title: The Effect of Learning Strategies, Learner Characteristics, and Prerequisite Knowledge on Student Success in Intermediate Algebra at a Community College
Presented by: Adrian M. DeWindt-King, Cumberland County College
Abstract:
A small public open-admissions community college in the northeast uses Accuplacer© for testing and placement of entering degree-seeking students. In fall 2008, sixty-eight percent of the students needed remediation in at least one level of mathematics. Historically, after completion of the remedial sequence students were under performing students who initially tested into Intermediate Algebra. The purpose of this project is to increase the number of students who pass and that receive a grade of B or higher in Intermediate Algebra, who completed the remedial sequence. The effect of learning strategies, learner characteristics, and the prerequisite knowledge of students is explored.

Session 40   Salon C (4th Floor)

Title: Improving Female Interest in Mathematics
Presented by: Edel Reilly, Indiana University of Pennsylvania
Abstract:
This presentation will focus on the issue of expanding female interest in mathematics. First, literature on female perceptions of their mathematics achievements will be discussed. Next, differences between female and male learning styles in relation to mathematics will be covered. Finally, the presentation will report on a study of middle school students and their perceptions of using writing as a tool to learn mathematics. This study's findings show that using writing can make mathematics more meaningful for students, particularly female students, and lead them to increased interest in the study of mathematics.

Session 41   Boardroom 3 (ML)

Title: Secondary Mathematics and Science Teachers' Interpretation of Integration
Presented by: Pat Lamphere Jordan & Toni Ivey, Oklahoma State University
Abstract:
Researchers sought to determine teachers' definition of "integration" as reflected in their daily written responses, unit lesson plans, and the final essays. The subjects were enrolled in an integrated mathematics and science curriculum course team-taught by a mathematics educator and a science educator. The course requirements included pre/post responses, presentations of assigned readings, a set of integrated lessons plans woven into a thematic unit, and a final essay. Several themes evolved as data was analyzed.

Session 42   Boardroom 4 (ML)

Title: Why does it have to be right before it can be shared?
Presented by: Kansas Pope, University of Central Oklahoma
Abstract:
The sharing of thinking when learning mathematics serves as a launching point for a variety activities comparing one's own thought processes with those of others. Students are able to internalize both the shared thinking and the process of negotiating and validating the thinking. When students are presented with incorrect answers, thought processes, or mathematical reasoning, they are provided with an opportunity to deepen their mathematical understandings. This case study of a mathematics content course for pre-service elementary teachers discusses perceptions of presenting only correct answers and how this perception differs between students and the instructor.

Session 43   Rosewood (4th Floor)

Title: Teacher Learning: Connecting Professional Development to the Mathematics Classroom
Presented by: Donna H. Foss, University of Central Arkansas
Abstract:
The objectives were to identify the characteristics of effective professional development (PD) involving mathematics teaching and learning when studied through the analysis of the teachers' content examinations, reflective journals, observations, and students' mathematics achievement to determine the extent to which the PD project goals were accomplished. The results include the transformation of the teachers' conceptions and instructional behavior: Mathematical concepts were understood instead of memorized; problem solving was emphasized instead of routine procedures and practice; and their students were exploring and investigating instead of listening to lectures, implying the project features should be at least considered in future professional development.

Session 44   Mayflower 1 (LL)

Title: An Examination of Pre-Service Teachers: Content Acquisition and Implementation
Presented by: Rebecca Ortiz & James Valles, Texas Tech University
Abstract:
Future teachers see proper pedagogical methods, train in appropriate educational fields, and have field experience in classrooms. One concern to explore is whether these future teachers feel they are prepared to perform. Participants are undergraduate pre-service teachers. Data is gathered in a mathematics course required of the elementary and middle level teacher certification programs. An examination of pre-service teachers' specific content comprehension, as well as their response to improve the teaching of the concept will occur. Self-evaluation responses will be examined for trends and whether there was in increase in self-efficacy regarding their ability to teach the concept.

Session 45   Mayflower 2 (LL)

Title: Popsicle Sticks, Ping Pong Balls, and Pennies: Tasks and Instruction Designed for Place Value Understanding
Presented by: Mary B. Swarthout & Beth Cory, Sam Houston State University
Abstract:
We describe an ongoing and iterative lesson design/implementation/revision cycle related to place value concepts. We will share our findings about how we have helped prospective teachers better understand the mathematics needed for teaching – specifically concepts and ideas related to place value. In addition, we want to share the collaborative process we used to negotiate the specific learning goals and to design lessons as an example of the way in which small but significant steps can contribute to the scholarly practice and inquiry regarding the preparation of teachers.

Session 46   Mayflower 3 (LL)

Title: Pre-service Elementary Teachers' Understanding of the Arbitrary Nature of a Unit
Presented by: Armando M. Martínez-Cruz & José N. Contreras, California State University, Fullerton
Abstract:
We discuss the findings of a research study with 92 prospective elementary teachers (PETs). The goal of the study was to better understand PETs' conceptions of the arbitrary nature of a unit. PETs completed two tasks. In the first task, they were asked what fractions or fractions could be represented by a shaded diagram. In the follow-up task they were asked whether the shaded diagram could represent 3/4, 3/5, 3/10, and 1 1/2 (3/2). The findings suggest that the PETs have a poor understanding of the concept of fraction and of the arbitrary and abstract nature of the unit.

3:00 p.m.—3:45 p.m.   Friday, March 11, 2011   Sessions 47—48

Session 47   Salon B (4th Floor)

Title: Characterizing an Orientation Toward Learning and Teaching Mathematics that Constrains Reflection
Presented by: Scott Courtney, Kent State University
Abstract:
This study investigated in-service mathematics secondary school teachers' ways of thinking that supported or constrained their capacity to reflect on their practice as they engaged in activities designed to promote powerful mathematical knowledge for teaching as proposed by Silverman and Thompson. Analyses identified two epistemic ways of operating that constrained teachers' capacity to reflect on their practice. An orientation toward learning and teaching of mathematics (an empirical orientation) is proposed as a potential way of thinking that accounts for the identified ways of operating and helps to explain the teachers' reticence to reflect.

Session 48   Salon C (4th Floor)

Title: Mathematics for Students with Special Needs
Presented by: Bea Babbitt, University of Nevada, Las Vegas
Abstract:
This session will present a synopsis of research and best practices in teaching students with special needs with particular emphasis on students with learning disabilities. Students with special needs often experience difficulty in understanding mathematical concepts, struggle to compute with accuracy, and find little success in problem solving. Over the past decades, however, many instructional strategies have been shown to be effective with these students. Participants will have the opportunity to discuss the implications of this research and the supports and barriers to its implementation in today's classroom.

Session 49   Boardroom 3 (ML)

Title: Mathematical explorations for middle grades teachers
Presented by: Anne Reynolds & Michael Mikusa, Kent State University
Abstract:
Our RCML presentations the past three years have explored some of the nuances of the teaching/learning setting that has emerged in the Mathematics in Mathematics Education (MIME) classes that faculty from mathematics and mathematics education have developed and taught for a number of semesters. These classes are intended to address the mathematical content needed for middle grades mathematics teachers whose original license was as elementary teachers with minimal mathematics content in their professional preparation. In this session we will report on the content of these classes, focusing on particular activities we have used.

Session 50   Boardroom 4 (ML)

Title: Assessment and Complexity of Non-Routine Problem Solving Involving Proportion Reasoning of Middle School Students
Presented by: Gabriel Matney & Jack Jackson, University of Arkansas Fort Smith
Abstract:
The research study follows a seventh grade teacher through the planning, implementation, and reflection of a proportional reasoning unit. The unit was designed to engage students in the construction of proportional understanding. As a means of measuring the change in student ability to solve non-routine novel problems the researchers' developed non-identical, content reliable and valid pre-post tests. The pedagogical process and assessment results will be discussed and participant ideas are welcome.

Session 51   Rosewood (4th Floor)

Title: A Standards-Aligned Systemic Approach to Elementary Mathematics: Elementary Mathematics Clinics as an Intervention
Presented by: Jason Petula, Penn State Harrisburg
Abstract:
Proficiency in mathematics has become an increasingly important skill. Research in mathematics education reveals that gaps in students' understanding appear early. These gaps grow rapidly as students progress through their schooling. The end results for these students are poor mathematical achievement and the pruning of multiple future career pathways. This presentation will reveal the results of an elementary mathematics clinic that was developed around the elements of a standards-aligned system. The Title I funded clinic was designed to support students in their current mathematics curriculum and also identify and reduce gaps in their mathematical understanding.

4:00 p.m.—4:45 p.m.   Friday, March 11, 2011   Sessions 52—54

Session 52   Mayflower 1 (LL)

Title: Effects of a reform-based mathematics content course for elementary teachers
Presented by: Ben Sloop & S. Megan Che, Clemson University
Abstract:
Participants will be introduced to the reform-based methods from a content course for elementary teachers as they explore conditional probability through the perceived paradox of non-transitive Efron Dice. Presenters will outline the course and describe how each of the mathematical tasks posed preceded an explanation of the content. Presenters will discuss themes generated through a phenomenological reduction of Pre-service Teachers' (PSTs') mathematical autobiographies. PSTs' mathematical content knowledge for teaching and pedagogical beliefs will be compared among PSTs that participated in reform-based and traditional sections. Analysis of these data and results and implications for teacher educators will be discussed.

Session 53   Mayflower 2 (LL)

Title: Teaching Lesson Plan Writing: From Applied Theory to Real Practice
Presented by: Jean McGehee, University of Central Arkansas
Abstract:
The written lesson plan can run the gamut from a sticky note with page and problem numbers to elaborate documents for college requirements or lesson study. Both preservice and inservice mathematics teachers seem to resist the written descriptions for planning that could focus instruction on discourse, connections, and assessment. This presentation shows an analysis of preservice teachers as they develop from a first lesson plan in methods to later plans in Internship II. It will also examine the work of inservice teachers in a middle school that have been a part of my Professional Development and Curriculum Alignment Project.

Session 54   Mayflower 3 (LL)

Title: Pre-service Elementary Teachers' Use of Realistic Considerations for Solving Problematic Word Problems
Presented by: José N. Contreras & Armando M. Martínez-Cruz , California State University, Fullerton
Abstract:
We will discuss the extent to which pre-service elementary teachers (PETs) use their real-world knowledge to solve problems for which the result of the arithmetic operation is problematic, if one takes into consideration the reality of the context. A paper-and-pencil test was administered to about 600 PETs enrolled in mathematics content courses. The test included 8 experimental items and 4 buffer items. Complete analysis has been performed for one group of 34 PETs. The findings are not very encouraging. The number of realistic responses varied from two to 25 (out of 34 possible for each problem).

4:00 p.m.—4:45 p.m.   **Friday, March 11, 2011**   **Sessions 55—56**

Session 55   Salon B (4th Floor)

Title: Manipulatives and Fractions
Presented by: Carolyn Pinchback, University of Central Arkansas
Abstract:
A common response that the investigator has received from inservice teachers after or during a workshop is the need for new or additional ideas to teach about fractions. With this interest, the investigator will survey students in two sections of Mathematics 3351: Number Systems about their knowledge and attitude about fractions. After using various materials (such as tangrams, Cuisenaire rods, literature, paper, fraction bars, food, and the like) to present equivalent fractions, and adding, subtracting, multiplying, and dividing with fractions, the investigator will repont on the preservice teachers' comments as it relates to their choice of material, the selected comment for the material, and why they chose the material or manipulative.

Session 56   Salon C (4th Floor)

Title: Preservice Teachers Coming to Know Mathematics
Presented by: Vivian R. Moody, Summer Bateiha, Hope Marchionda, & Wanda Weidemann, Western Kentucky University
Abstract:
Research suggests that many practicing teachers do not possess the breadth and depth of knowledge needed to teach mathematics effectively. Overwhelmingly, this is the case for many preservice elementary and middle school teachers who enter the classroom without a deeper conceptual understanding of mathematical concepts. This lack of conceptual understanding may impact these teachers' ability to respond to students' questions and their ability to extend mathematics lessons beyond basic skills. To address the problem of teachers' inadequate level of content knowledge and conceptual understanding in mathematics, the Department of Mathematics implemented a three-course sequence of Mathematics for Elementary Teachers. In light of this implementation, mathematics educators developed a research project to study the impact of this three-course sequence on preservice teachers' mathematics content knowledge. This presentation will share the results of this study.

5:00 p.m.—5:45 p.m.   **Friday, March 11, 2011**   **Wilson Memorial Lecture**

Keynote   Rosewood (4th Floor)

Title: Race to the Top with the Next Generation of STEM Innovators

Presented by: Linda Sheffield, Northern Kentucky University

Registration (Lobby, L)   8:00 am – 10:00 am

8:30 a.m.—9:15 a.m.   Saturday, March 12, 2011   Founder's Lecture

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Keynote   Rosewood (4th Floor)

Title: The Nature and the Roles of Desirable Difficulties in Mathematics Teaching and Learning

Presented by: William R. Speer, Kent State University

9:30 a.m.—10:15 a.m.   Saturday, March 12, 2011 Sessions 57—58

Session 57   Boardroom 3 (ML)

Title: The Sociopolitical Mathematical Student Experience: Negotiating Equity, Identity, and Power as a Secondary Mathematics Student-Teacher
Presented by: Juan Manuel Gerardo, University of Illinois at Urbana-Champaign
Abstract:
Research on effective teaching of marginalized youth tends to focus on practicing teachers and their classrooms. My research focus is the student teaching experience, as it apprentices pre-service teachers into the profession and influences their future teaching practices. How do pre-service teachers negotiate their goals of equity in mathematics during their student teaching? How can they employ practices of equity in a shared classroom environment? Lastly, how does this experience influence the pre-service's decision to work at a "high-needs" school? The study will contribute to the research regarding student-teaching, specifically, the development of future mathematics teachers in "high-needs" secondary schools.

Session 58   Boardroom 4 (ML)

Title: Digital and Online Technology in Mathematics Education
Presented by: Patrick Wachira & Enock Meshack, Cleveland State University
Abstract:
Technology has been found to be an effective means to produce growth in students' understanding of mathematics content but yet surveys of teachers show consistent declines in the use of technologies implying that widespread integration of educational technology into classroom instruction has yet to be realized. This paper will explore some of the current technological tools available to mathematics teachers and students. The aim is to review, evaluate and recommend technologies that can support the teaching of mathematics. Specifically the paper will focus on digital and online technologies.

Session 59   Rue Reolon (SL)

Title: An Early Professional Development Opportunity for Preservice Teachers
Presented by: Stephanie Kolitsch & Joyce Swan, University of Tennessee at Martin
Abstract:
 Many professional development opportunities exist for teachers, but few of these opportunities extend to preservice teachers. Students majoring in education at the University of Tennessee at Martin had the opportunity to be Student Instructional Assistants (SIAs) for Project IMPACT. Students chosen to be SIAs had the unique opportunity to participate in a professional development workshop with middle school mathematics teachers to learn content, multiple representations of concepts, classroom management skills, and the appropriate use of technology. This paper examines the reactions of SIAs to their participation in Project IMPACT.

Session 60   Mayflower 1 (LL)

Title: Preparing Secondary Mathematics Teachers for Academic Language & Practice
Presented by: Karen L. Terrell, Boston College
Abstract:
This presentation will present an exploration of the impact of an instructional intervention on the initial practice of pre-service secondary mathematics teachers. The intervention itself contained strategies designed to support English-language learners' understanding of mathematics and its register. The current findings of the study will be presented, and implications for future research and practice will be discussed.

Session 61   Mayflower 2 (LL)

Title: Noticing Numeracy Now (N^3): A collaborative research project to develop preservice teachers' abilities to professionally notice children's mathematical thinking
Presented by: Jonathan Thomas, Edna Schack, Molly Fisher, Sara Eisenhardt, Janet Tassell, Todd Brown, Margaret Yoder, Patricia Higgins, & Greg Gierhart, Northern Kentucky University
Abstract:
The goal of the Noticing Numeracy Now (N3) research project is to determine the extent to which an innovative learning experience focused on the professional noticing of children's early numeracy thinking develops preservice teachers' capacity to attend to, interpret, and respond appropriately to children's mathematical thinking. The N3 project is being implemented at eight Kentucky public universities. This conference session will involve attendees in a sample of the module that includes video observations and interactive discussions around children's mathematical thinking.

9:30 a.m.—10:15 a.m.   Saturday, March 12, 2011 Sessions 62—64

Session 62   Mayflower 3 (LL)

Title: The Rumored Math Gene
Presented by: Candace Joswick & Sarah Gilchrist, Ohio State University
Abstract:
The rumored math gene is explored by identifying sources of the myth. How belief in a math gene negatively affects students mathematical experience is explored. The knowledge that certain math topics are difficult and what might be done to overcome those challenges is posed as an answer to the math gene myth problem.

Session 63   Salon B (4th Floor)

Title: Mastering Basic Facts Using Online Tools
Presented by: Lynn Columba, Lehigh University
Abstract: Educators agree that students should develop automaticity with their math facts. Learn what we can do when students are struggling to learn their basic facts; identify prerequisite knowledge that might be lacking for these students; and, discover how these findings have been incorporated into the First in Math On-line Program. My research into the use of First in Math Skill Sets, although based on a small sample of third graders, who were struggling with the multiplication facts, suggests their use of software along with a variety of approaches can lead to significant improvements. Repetitive practice that is fun, motivating, and challenging, has its place along with instruction that invite students to notice and explore relationships between and among number sentences.

Session 64   Salon C (4th Floor)

Title: Developing and Sustaining Mathematical Discourse: The Possibility of Problematic Tasks
Presented by: George Abshire, Oklahoma State University & Stacy Reeder, University of Oklahoma
Abstract:
Research on creating an environment that supports and sustains mathematical discourse in a middle school classroom will be presented. A problematic task (The Greek Cross) serves as the focal point for generating discussion within small groups and the subsequent class discussion. Student work and vignettes of discussion will be presented.

Session 65   Boardroom 3 (ML)

Title: Facilitating Prospective Teachers' Conjecturing and Questioning Strategies using Dynamic Technology-Supported Instruction
Presented by: Farshid Safi, the College of New Jersey
Abstract: Working with prospective secondary teachers during a semester long methods course, specific topics ranging from geometry, algebra and calculus were explored. Students had a chance to explore their conjectures and validate their mathematical reasoning through multiple representations including graphical and numerical analyses. Without the aid of such dynamic instruments, students illustrated a disjointed and often limited understanding of high school mathematics (Lee, 2005; Zbiek & Heid, 2009). Using the TPACK framework, prospective teachers' conjectures regarding areas of geometric figures, notion of even & odd functions as well as behavior of trigonometric functions were thoroughly examined and will be discussed.

Session 66   Boardroom 4 (ML)

Title: An alternative Approach to Assessing Critical Thinking Skills in Undergraduate Mathematics
Presented by: Jerry Obiekwe, the University of Akron
Abstract: Course level assessment has become a household word in higher education. In mathematics, for example, you are not only required to provide additional evidence that your course outcomes are being met, but to also provide evidence of growth in critical thinking skills. Oftentimes, in domain specific subjects like mathematics, critical thinking is inextricably related to proficiency in the learning outcomes. The latest assessment model demands the untangling of this relationship in order to provide separate evidence of proficiency in learning outcomes and critical thinking skills. This study discusses an alternative approach to assessing critical thinking skills and its implications to teaching and learning undergraduate mathematics.

Session 67   Rue Reolon (SL)

Title: An In-depth Look at Secondary Preservice Teachers' Pedagogical Content Knowledge of Probability
Presented by: Sarah Ives, Texas A&M University-Corpus Christi
Abstract: Teaching and learning probability is complex and requires certain pedagogical content knowledge (PCK). Research from a multi-case study on teaching probability indicated that a particular task-based interview had the most influence on preservice secondary teachers' PCK. In this interview preservice teachers critiqued 1) an exploratory activity related to finding the probability of fair dice in a real world context; 2) sample student work; as well as 3) video clips of the related lesson. These materials will be shared along with a discussion of the specific themes and components of PCK these preservice teachers exhibited.

Session 68   Mayflower 1 (LL)

Title: Revision of the MTEBI for Korean Preservice Teachers
Presented by: Dohyoung Ryang, the University of North Carolina at Greensboro & Tony Thompson, East Carolina University

Abstract:
This study sought to revise the Mathematics Teaching Efficacy Beliefs Instrument (MTEBI) for Korean preservice teachers. The MTEBI was translated into Korean and 4 Korean mathematics teacher education experts were asked to analyze the instrument to ascertain if it would be appropriate for use within the Korean culture. The experts concluded that 13 of the 21 items on the MTEBI were inappropriate. Their concerns included awkwardness, tense disagreement, vagueness, multiple meanings, and illogicality. As a result, these items were modified to better fit Korean language and culture.

Session 69   Mayflower 2 (LL)

Title: The Influence of Number Names on Children's Understanding of Place Value
Presented by: Sandra Browning, University of Houston-Clear Lake

Abstract:
This study explored the influence of using explicit number names on prekindergarten and kindergarten students' ability to rote count, read two-digit numerals, model two-digit numbers, and identify the place value of individual digits in two-digit numerals through individual student pre- and post-assessments. Chi-square tests for independence showed significant relations between (1) the control and treatment group membership on the post-assessment of modeling two-digit numbers and (2) place value identifications and group membership. Analysis of the children's performance and error patterns revealed interesting differences between children taught with explicit number names and children taught with traditional number names.

Session 70   Mayflower 3 (LL)

Title: Spatial Reasoning and Student Discourse
Presented by: Lindsay Prugh, Oklahoma Christian University

Abstract:
How can student discourse be enhanced in the mathematics classroom? The results of the research conducted will focus on the improvement of student discourse through the use of spatial reasoning activities in a low-level undergraduate mathematics classroom. Additionally, participants will be involved in spatial reasoning activities followed by discussion about the task and student discourse.

Session 71   Salon B (4th Floor)

Title: A Mathematics Differentiation Model to Help New Teachers Engage All Students
Presented by: Janet Herrelko, University of Dayton
Abstract:
This study tests a differentiation model that is designed help new mathematics teachers write lesson plans that address the needs of all classroom students. The differentiation method was developed by collaborating with classroom teachers and university faculty. The theoretical framework came from the Response to Intervention system that identifies and classifies students' academic progress. In-service teachers reviewed the format and identified a key missing element. A student teacher pilot tested the method and gathered data. The result of this collaborative process created a four-tiered format for lesson differentiation to engage all students in learning mathematics.

Session 72   Salon C (4th Floor)

Title: Determining Teacher Quality in Teach for America Alternative Certification Teachers
Presented by: Brian R. Evans, Pace University
Abstract:
It is important to understand the relationships between content knowledge and self-efficacy in new teachers. The purpose of this study was to understand the level of self-efficacy and differences between content knowledge and self-efficacy among teachers of different undergraduate majors in the Teach for America program. After taking mathematics and self-efficacy tests, findings revealed that teachers had high levels of self-efficacy. Mathematics related majors had higher mathematical content knowledge than business majors, but similar self-efficacy levels. Liberal arts majors had similar content knowledge and levels of self-efficacy as mathematics related majors.

Session 73   Boardroom 3 (ML)

Title: Pre-service Teacher Efficacy of Teaching Mathematics
Presented by: Nancy Cerezo, Saint Leo University
Abstract:
Preparing future elementary teachers in the area of mathematics is essential to their success in the classroom. Many pre-service teachers are uncomfortable with their own mathematical ability that may impact their teaching of the content. This study is in its first stages to gather data on the pre-service teachers' efficacy for teaching mathematics and how it changes over time.

Session 74   Boardroom 4 (ML)

Title: Assessing How Pre-service Teachers Understand Balance through Clinical Interviews and a Virtual Tool
Presented by: Jennifer Wilhelm, University of Kentucky
Abstract:
Pre-service teachers' (PSTs') interview responses were used to assess their understanding of balance when challenged with tasks involving a virtual manipulative. PSTs relied on visual cues to implement procedures that were often inappropriate for the task at hand. When confronted with missing-value balance tasks, 47% of the PSTs attempted an incorrect procedure using direct proportions while others employed an incorrect fractional method. Most interviewees relied on guess and check reasoning. Implications of this study advise the need for purposeful experiences within education programs that lead to better connections across the math and science disciplines of big ideas such as balance.

Session 75   Rue Reolon (SL)

Title: A Framework to Study Preservice Teachers' Practices of Anticipating Students' Mathematical Responses
Presented by: Sarah Kasten, Northern Kentucky University
Abstract:
Preservice mathematics teachers often struggle to engage students in rich tasks and discussions in ways that result in meaningful learning. Stein, Engle, Hughes, and Smith (2008) provide a model to support teachers, new and experienced, in facilitating mathematical discussions around rich tasks. The first practice in this model, anticipating students' mathematical solutions, is foundational to the model, yet research indicates that doing this with advanced content knowledge is difficult for preservice teachers (Nathan & Petrosino, 2003). This session will present a framework designed to examine preservice teachers' practices of anticipating and research resulting from the use of the framework.

Session 76   Mayflower 1 (LL)

Title: Exploratory Analysis of Korean Elementary Preservice Teachers' Efficacy Beliefs in Mathematics Teaching
Presented by: Dohyoung Ryang, the University of North Carolina at Greensboro
Abstract:
This study investigated Korean elementary preservice teachers' efficacy beliefs in mathematics teaching. Data was collected by means of the Mathematics Teaching Efficacy Beliefs Instrument from 106 elementary preservice teachers in Korea. Analysis of data revealed that preservice teachers at the end of their program had significantly lower personal efficacy and outcome expectancy in mathematics teaching than those of preservice teachers at the beginning of the program. Possible reasons for these unusual findings include heavy course work in mathematics content and socio-cultural influences such as strong parental support and prevailing private education.

Session 77   Mayflower 2 (LL)

Title: Enhancing Preservice Teachers Geometric Reasoning with Shape Makers
Presented by: Gayle M. Millsaps, Purdue University Calumet
Abstract:
Students routinely have difficulty understanding the relationships among different geometric shapes and the relationships between the definitions of geometric shapes and their properties because of their inadequate concept images. The Shape Makers curriculum supports students in (re)constructing their concept images of special quadrilaterals and triangles through students' interaction with pre-defined quadrilaterals in a dynamic computer environment. This study looks at preservice elementary teachers' ability to understand and to communicate their understanding of the properties of special quadrilaterals before and after exposure to the Shape Makers curriculum.

Session 78   Mayflower 3 (LL)

Title: Classroom Discourse in a Standards-Based Classroom
Presented by: Elaine Wiegert, University of South Carolina Upstate & S. Megan Che, Clemson University
Abstract:
In this case study we examine the classroom discourse in a middle school mathematics classroom. Classroom instruction was filmed over a period of two weeks. Teacher talk was analyzed to determine the type of talk: revoicing, asking students to restate someone elses' reasoning, asking students to apply their reasoning to someone elses' reasoning, prompting students for further participation and using wit time (Chapin, O'Conner & Anderson, 2003) as well as other conventions such as pointed speech. Student talk was analyzed to determine the types of talk with both teacher and with peers. Percentages of teacher and student talk were calculated.

11:30 a.m.—12:15 p.m.   Saturday, March 12, 2011 Sessions 79—80

Session 79   Salon B (4th Floor)

Title: Writing to Reveal Math Understanding
Presented by: Bob M. Drake, University of Cincinnati
Abstract: Diagnosis of student errors is problematic when teachers do not really know what students think. Computation exercises provide some insights, but students' written explanations clarify the errors of their thinking. Samples of students' written work reveal the kinds of information gleaned from writing about mathematics.

Session 80   Salon C (4th Floor)

Title: Teacher Differences in Mathematics Knowledge, Attitudes, and Self-Efficacy Among NYC Teaching Fellows
Presented by: Brian R. Evans, Pace University
Abstract:
Providing students in urban settings with quality teachers is important for student achievement. This study examined the differences in content knowledge, attitudes toward mathematics, and self-efficacy among teachers in the NYC Teaching Fellows program, and informs teacher education in mathematics alternative certification. Teaching Fellows were given a mathematics content test and two questionnaires, and took a standardized test. Findings revealed that high school teachers had significantly higher content knowledge than middle school teachers. Mathematics Teaching Fellows had significantly higher content knowledge than Mathematics Immersion Teaching Fellows. Mathematics and science majors had significantly higher content knowledge than other majors.

12:15 p.m.—1:15 p.m.   Saturday, March 12, 2011

Lunch @ Rosewood, 4th Floor
(The room needs to be vacated by 1:15 p.m. to accommodate another group)

2:00 p.m.—4:30 p.m.   Saturday, March 12, 2011

Executive Board Meeting @ Belvedere
(The room is located at the back of the Orchid's restaurant near the Lobby area)

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Abshire	George	oktoy1997@cox.net	64	31
Babbitt	Bea	bea.babbitt@unlv.edu	48	25
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Brahier	Daniel	brahier@bgsu.edu	1	8
Breyfogle	M. Lynn		28	18
Brown	Sue	browns@uhcl.edu	25	17
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Caniglia	Joanne		33	20
Cassel	Darlinda	dcassel2@uco.edu	11, 19, 27	11, 14, 17
Cerezo	Nancy	nancy.cerezo@saintleo.edu	73	35
Che	S. Megan	sche@clemson.edu	52, 78	27, 36
Christie	Gary	gchristi@bw.edu	31	19
Columba	Lynn	lynn.columba@gmail.com	9, 63	11, 31
Contreras	José N.	jncontrerasf@bsu.edu	46, 54	24, 27
Copolo	Cynthia F.		16	13
Cory	Beth		45	24
Courtney	Scott	scourtn5@kent.edu	47	25
Crawford	Ann R.	jjcra@earthlink.net	16	13
DeWindt-King	Adrian M.	adewindtking@cccnj.edu	39	22
Dogbey	James	jdogbey@clemson.edu	12	12
Drake	Bob M.	bob.drake@uc.edu	15, 79	13, 37
Eaton	Betty	beaton@okla-adventist.org	19	14
Edwards	Michael Todd	m.todd.edwards@gmail.com	26	17
Eisenhardt	Sara		61	30
Evans	Brian R.	bevans@pace.edu	72, 80	34, 37
Faulkenberry	Thomas J.	Thomas_Faulkenberry@tamu-commerce.edu	6	10
Faulkenberry	Eileen Durand	Eileen_Faulkenberry@tamu-commerce.edu	38	21
Fisher	Molly		61	30
Fletcher	Justin	Fletcher27@gmail.com	11	11
Foss	Donna H.	donnaf@uca.edu	43	23
Gerardo	Juan Manuel	gerardo1@illinois.edu	57	29
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Gilchrist	Sarah		62	31
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Hanlon	Adele	adele@hanlons.org	17	14
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Herrelko	Janet	janet.herrelko@notes.udayton.edu	71	34
Higgins	Patricia		61	30
Hughes	Teresa	tas031@shsu.edu	29	18
Ives	Sarah	sarah.ives@tamucc.edu	67	32
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Jackson	Tamora	tljcksn2@memphis.edu	21	15
Jackson	Christa	christa.jackson@uky.edu	37	21
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James	Wendy	wmjames@okstate.edu	10	11
Johnson	Iris DeLoach	johnsoid@muohio.edu	36	21
Jordan	Pat Lamphere	patricia.jordan@okstate.edu	41	23
Joswick	Candace	joswick.1@osu.edu	62	31
Kasten	Sarah	kastens1@nku.edu	75	35
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Kohrman	Darlene E.	dkohrman@kvcc.edu	22	15
Kolitsch	Stephanie	styler@utm.edu	59	30
Krebs	Angela	askrebs@umd.umich.edu	5	9
Laubach	Timothy A.		4	9
Livingston	Carol	cvliving@olemiss.edu	24	16
Marchionda	Hope		56	28
Martínez-Cruz	Armando M.	amartinez-cruz@exchange.fullerton.edu	46, 54	24, 27
Matney	Gabriel	gmatney@uafortsmith.edu	50	26
McGehee	Jean	jeanm@uca.edu	53	27
McKeny	Timothy	mckeny@ohio.edu	23	16
Meshack	Enock	e.meshack@csuohio.edu	58	29
Mikusa	Michael	mmikusa@kent.edu	33, 49	20, 26
Millsaps	Gayle M.	millsaps@purduecal.edu	77	36
Moody	Vivian R.	vivian.moody@wku.edu	56	28
Naresh	Nirmala	nareshn2@muohio.edu	36	21
Obiekwe	Jerry	Accessx@uakron.edu	66	32
Ornona	Cynthia	cynthia.orona@okstate.edu	30	18
Ortiz	Rebecca	rebecca.ortiz@ttu.edu	44	24
Petula	Jason	jason.petula@psu.edu	51	26
Pinchback	Carolyn	carolinp@uca.edu	55	28
Pope	Kansas	okeystate@aol.com	42	23
Powell	Angiline		21	15
Prugh	Lindsay	lindsay.prugh@oc.edu	70	33
Redmond	Adrienne	adrienne.redmond@okstate.edu	30	18
Reeder	Stacy	reeder@ou.edu	4, 18, 64	9, 14, 31
Reilly	Edel	ereilly@iup.edu	40	22
Reynolds	Anne	areynol5@kent.edu	49	26
Richardson	Kerri	kerri_richardson@uncg.edu	27	17

Rossman	Cathleen	rossman@rci.rutgers.edu	7	10
Ryang	Dohyoung	d_ryang@uncg.edu	68, 76	33, 36
Safi	Farshid	safi@tcnj.edu	65	32
Schack	Edna		61	30
Scheuermann	Amy		37	21
Sharon	Valerie	vvs001@shsu.edu	29	18
Sheffield	Linda	sheffield@nku.edu	Wilson's Speaker	6, 28
Sloop	Ben	bsloop@clemson.edu	52	27
Speer	William R.	william.speer@unlv.edu	Founder's Speaker	7, 29
Strassfeld	Brenda	brenda.strassfeld@touro.edu	20	15
Strayer	Jeremy F.	jeremy.strayer@indstate.edu	34	20
Swan	Joyce	jswan@utm.edu	59	30
Swarthout	Mary B.	swarthout@shsu.edu	45	24
Tassell	Janet		61	30
Terrell	Karen L.	terrelka@bc.edu	60	30
Thomas	Jonathan	thomasj13@nku.edu	61	30
Thompson	Tony	thompsonan@ecu.edu	35, 68	20, 33
Utley	Juliana	juliana.utley@okstate.edu	30	18
Valles	James	james.valles@ttu.edu	44	24
van Garderen-Anderson	Delinda		37	21
Wachira	Patrick	p.wachira@csuohio.edu	58	29
Wall	Edward	ewall@ccny.cuny.edu	32	19
Weidemann	Wanda		56	28
Wiegert	Elaine	ewiegert@uscupstate.edu	78	36
Wilburne	Jane M.	jmw41@psu.edu	28	18
Wilhelm	Jennifer	jennifer.wilhelm@uky.edu	74	35
Wohlhuter	Kay A.	kwohlhut@d.umn.edu	14	12
Yee	Sean	seanpyee@gmail.com	3	9
Yoder	Margaret		61	30
Young	Elaine	elaine.young@tamucc.edu	2	8
Zollman	Alan	zollman@math.niu.edu	13	12