

# MAA Seaway Section Meeting

## Spring 2009 at R•I•T

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### Graduate Student Abstracts

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**1. Teachers' Masters Capstone Projects in Secondary and College Mathematics**  
Session Organizer, Keary Howard, SUNY Fredonia

These sessions are highlighted by the presentation of research results from secondary school mathematics teachers completing their capstone Masters projects. Topics and presenters include:

**SESSION 1. SECONDARY AND COLLEGE MATHEMATICS ACHIEVEMENT**

**1. Zachary Kaus, SUNY Fredonia**

You Don't have to go Home, but You can't Stay Here: A Study of the Effects of Take-Home Quizzes and Achievement of Calculus Students.

**1. Kristen Drobits, SUNY Fredonia**

To Check or not to Check? A Study of the Effect of a Homework Checking System versus a Homework Collection Policy on Academic Achievement in an Introductory College Mathematics Class.

**2. Sarah Yates, SUNY Fredonia**

A Study of the Effects of Guided Note Taking versus Conventional Note Taking in a Pre-Calculus Mathematics Class.

**3. Rachel Olson, Jamestown City**

To Be Organized or not to Be Organized? A Study of the Effects of Notebook Organization on Academic Achievement in Secondary Mathematics Classrooms.

**4. Maria Oddo, SUNY Fredonia**

Is Extra Time Really Helpful? A Study of the Effects of Supplemental Instruction on Achievement in Calculus and Discrete Mathematics Classes. Maria Oddo, SUNY Fredonia

**SESSION 2, CONTEXT AND COGNITION IN SCHOOL MATHEMATICS**

**1. Michelle Klopf, LoGuidice BOCES**

Keep It Fresh: Review Strategies for Cumulative Mathematics Tests.

**2. Heather Eckman, SUNY Fredonia**

Misconceptions Related to Integer Operations in Middle School Mathematics Students.

**3. Maria Hoak, Silver Creek Central Schools**

Is Pencil Better for Math? A Study on the Use of Pen versus Pencil on Standardized Algebra Exams.

**4. Karen Diehl, SUNY Fredonia**

A Study of the Effects of Calculator Use on Basic Math Skills Test Scores in the 8<sup>th</sup> Grade Middle School Mathematics Classroom.

**5. Amanda Lindstrom, Dunkirk City School District**

Is Organization the Key to Success in Mathematics? The Role of Organization through the Use of Notebooks in Eighth Grade Mathematics.

**6. Nick Battista, RIT**

**Spectrally Accurate Initial Data for Numerical Relativity**

Einstein's theory of general relativity has radically altered the way in which we perceive the universe. Einstein's breakthrough was to realize that the fabric of space is deformable in the presence of mass, and that space and time are linked into a continuum. Much evidence has been gathered in support of general relativity over the decades. Some of the indirect evidence for GR includes the phenomenon of gravitational lensing, the anomalous perihelion of mercury, and the gravitational redshift. One of the most striking predictions of GR, that has not yet been confirmed, is the existence of gravitational waves. The primary

source of gravitational waves in the universe is thought to be produced during the merger of binary black hole systems, or by binary neutron stars. The starting point for computer simulations of black hole mergers requires highly accurate initial data for the space-time metric and for the curvature. The equations describing the initial space-time around the black hole(s) are non-linear, elliptic partial differential equations (PDE). In this talk, we will discuss how to use a pseudo-spectral (collocation) method to calculate initial puncture data corresponding to both single and binary black hole systems.

**7. Ryan Lewis, RIT**

**A Few Problems from the Fibonacci sequence**

We present some recent work on two open problems related to Fibonacci numbers.

**8. Peter Maceli, Ohio State University**

**Universal Graphs**

In 1963 Erdős and Rényi showed that there is essentially one countably infinite random graph. That is, if an infinite graph with a countable number of vertices is chosen at random then with probability 1 we will always obtain the same graph (up to isomorphism). In this talk we give a proof of this result and discuss a number of other interesting properties and generalizations of this “universal” graph.

**9. Elizabeth Wilcox, SUNY Binghamton**

**Wreath Products: An Introduction**

Ever wonder what is a wreath product of groups? In this expository talk I'll give a straightforward definition and discuss examples of wreath products. These groups are one of the nicest varieties of semidirect products, although they are not always appreciated as such. We'll talk about the difference between a permutational wreath product and a standard wreath product, and if time permits we'll even see an easy way to construct an automorphism of a wreath product.