

Tuesday, January 6, 2009
Empire Ballroom, Omni Shoreham Hotel

Knot and Link Complements from an Algebro-geometric Perspective

Emily Landes, UT Austin

SPWM 2004

Abstract: As character varieties are a powerful tool in studying hyperbolic 3-manifolds, we are motivated to better understand the algebro-geometric structure of the character variety of hyperbolic knot and link complements. The current goal is to determine which complex surfaces can arise as canonical components of character varieties for hyperbolic 2-component link complements. In my talk I will develop intuition for this subject through discussing twist knots and the Whitehead link.

Mathematics of a Broken Heart

Lisa Driskell, Purdue University

SPWM 2003

An arrhythmia is any disturbance from the normal periodicity of the heart beat and such a disturbance may lead to serious and even fatal conditions of the heart. Dynamical systems can be used to describe cardiac action potentials and are thus an invaluable tool used in the pursuit to understand the electrical activity of the heart. In this talk we will discuss the traveling waves in cardiac models and the use of these models to describe certain abnormal beat patterns of the heart.

Teaching practices in elementary mathematics: procedural vs. conceptual understanding

Anna Varvak, Soka University of America

SPWM 1998

Abstract: Contrary to the high-stakes test programs like the No Child Left Behind, within the mathematical education community there is a drive towards improving teaching that focuses on understanding the fundamental concepts rather than ability to perform pre-set procedures. In particular, Liping Ma has created quite a stir with her recent book, *Knowing and Teaching Elementary Mathematics* (1999), where she presents a qualitative study comparing US and Chinese elementary-school teachers in their knowledge, understanding, and teaching of elementary mathematics. This past summer, myself, Dr. Amanda Serenevy, and Dr. Julie Turner organized a five-day

seminar in for teachers and educators South Bend, Indiana. The overall objectives for the participants of this workshop were to: 1. Examine the concepts underlying the conventional procedures taught in upper elementary and middle school, 2. Share teaching strategies that promote learning of the underlying concepts, thereby deepening student understanding of procedures, 3. Develop lesson plans that engage conceptual learning in the process of strengthening procedural knowledge. Everyday, we discussed a broad topic: multiplication and place value, integers, representing and understanding linear relationships, and equivalent representations of fractions, decimals, and percents, as well as problem solving. Our group of participants was small, about eight, which allowed for sharing experiences and ideas in-depth. The workshop provided me with a focus group of teachers and educators of elementary mathematics. I will share some of the results from that workshop, and talk about my ideas for future research in the subject that flowed out of this experiment.

Spaces with algebraic structure

Julia Bergner, UC Riverside

SPWM 1998

Abstract: Topology and algebra come together nicely when we give a topological space an algebraic structure, such as that of a group. However, up to homotopy there are actually many equivalent ways to describe such a structure. In this talk I'll explain a few of these characterizations and give some insight into why they are equivalent to one another but also individually interesting.
