KENNESAW STATE UNIVERSITY

College of Science and Mathematics
Department of Mathematics

MATH TALKS 2014-2015

The Department of Mathematics weekly seminar series. Math Talks is open to all KSU faculty, students, and invited visitors to present any math or math-related topic. Seminars typically require little or no advanced mathematical knowledge are open to anyone.

Unless specified otherwise, seminars are held Thursdays 12:30-1:45 pm in MS 109 (Kennesaw Campus).

Thursday, April 23, 2015

- Speaker**: Dr. Denise A. Spangler**, Associate Dean, College of Education, University of Georgia
- Title: *Using Task Dialogues to Enhance Preservice Teachers' Abilities to Orchestrate Discourse*
- Abstract: I will describe an activity designed to help preservice elementary school teachers develop mathematical knowledge for teaching in the domain of facilitating mathematical discussions. The activity involved preservice teachers repeatedly writing task dialogues, imaginary conversations between a child and teacher about a problem solving task, in which they practiced responding to correct, partially correct, and incorrect student responses. Preservice teachers then implemented these same tasks with children in a field experience setting. I will describe two different iterations of the activity and field experience in detail and the insights into preservice teacher knowledge each iteration afforded us. Although the context for this study was K-5 preservice teachers and students, the central idea is applicable to preK-12.

Thursday, April 16, 2015

- Speaker: **Dr. Bo Yang**, Kennesaw State University
- Title: *Chaos, Fractals, Smale's horseshoe, and Cantor's Dust*
- Abstract: We will study two examples of chaotic dynamical systems and see how they are related to fractals.

Thursday, April 2, 2015

- Speaker: **Dr. Josip Derado**, Kennesaw State University
- Title: *The Cryptography: How I Learned to Stop Worrying and Love the Secret Code*
- Abstract: Cryptography is in fashion these days. The more frequent breaches into company and public networks, and concerns of protection of privacy brought cryptography to the main stream of mathematics application. There is also a movie, Imitation Game, about one of the greatest cryptographer of all time, Alan Turing. In this talk we will cover all the basics of the modern cryptography, including elliptic curves and Rubik's Cube.

Thursday, March 19, 2015

- Speaker: **Dr. Yuliya Babenko**, Kennesaw State University
- Title: *A glimpse into the world of Geometric Modeling*
- Abstract: Mathematicians, computer scientists, scientists, and engineers all work with curves and surfaces, which arise from a finite amount of data points. Different goals and different tools available in the fields lead to different approaches to the same subject, which often lead to new methods and discoveries. For instance, how do mathematicians typically represent curves and surfaces? On the other hand, how do computer scientists naturally represent curves and surfaces? Or, how do scientists need to represent curves and surfaces? What about engineers? In this talk we will introduce some basic ideas (interpolation and approximation) as well as sophisticated tools of geometric modeling (Bezier curves and B-splines), and discuss their theoretical advantages/disadvantages as well as powerful algorithms.

Thursday, March 12, 2015

- Speaker: **Dr. Lewis VanBrackle**, Kennesaw State University
- Title: *Local Warming: A Tale of Two Cities*
- Abstract: We hear a lot about global warming in general, but less about the effects of climate change on specific places. We will examine changes in mean seasonal temperatures and frost-free days in two of my favorite cities. The statistical techniques used are quite simple, but yield evidence of differences in the way climate change manifests itself in the two cities.

Thursday, February 5, 2015

- **Four short videos on the topic of mathematics and cryptography**
- Title: *Mathematics, Secrets and Codes*

Thursday, January 29, 2015

- Speaker: **Dr. Josip Derado**, Kennesaw State University
- Title*: Mathematical Gems: Is linear algebra really linear?*

Thursday, November 20, 2014

- Speaker: **Dr. Tad Watanabe**, Kennesaw State University
- Title: *Mathematics Teacher Education in Japan*
- Abstract: Cross national studies in any field allow us to more clearly see ourselves by making the familiar unfamiliar. Mathematics teacher education is not an exception. In order to help us reflect on our mathematics teacher education programs/practices, I examined Japanese mathematics teacher education programs with a particular focus on student teaching. Student teaching has long been recognized as one of the most critical component of teacher education programs. Although both mathematics teachers and mathematics teacher educators acknowledge the critical importance of student teaching, there are many concerns and obstacles in designing and implementing high quality student teaching experiences. In this talk, I will share the findings from my recent visit to Japanese national universities and the survey of cooperating teachers. The talk will conclude with some questions that might guide our reflections on student teaching.

Thursday, November 13, 2014

- Speaker: **Dr. Wendy Sanchez**, Kennesaw State University
- Title: *How do we Prepare Mathematics Teachers?*
- Abstract: In this Math Talk, we will think about what experiences prospective mathematics teachers need during their preservice teacher education programs. We will consider what we know about preservice teacher preparation in methods courses in the United States and what we need to know. Results of a study on mathematics methods activities will be shared along with research questions from an on-going study and a proposal to the National Science Foundation to fund a conference on mathematics methods instruction.

Thursday, November 6, 2014

- Speaker: **Dr. Sherry Ni**, Kennesaw State University
- Title*: The students who participated in the SAS Data Mining Shootout this year will present their work*
- Abstract: As population density increases, and socioeconomic factors trend downward, increasing crime rates become a major concern for our country. This project analyzes how to allocate police resources to minimize the crime rate throughout the target cities. The provided analysis brings to light new evidence on crime trends were possibly missed with previous statistical methods. This analysis will help determine how to cross train the police force effectively to respond to specific crimes and an overall increasing crime rate.

Thursday, October 30, 2014

- **Videos**
- Title: *The Life and Work of Kurt Gödel*

Thursday, October 23, 2014

- Speaker: **Dr. Josip Derado**, Kennesaw State University
- Title: *The Birth of Modern Mathematics - Poincaré vs. Hilbert Part 2*
- Abstract: This talk follows the development of modern mathematics since 1850 until the collapse of Hilbert's Program in the 1930's. It starts with the work of George Boole and Gottlob Frege and their work to establish mathematical logic. It follows with discussions on Georg Cantor and his infinities. Then we follow the mathematical war on the turn of the 20th century between Poincaré and Hilbert. Finally we discuss the work of Kurt Gödel and his solution to the Russell Paradox. The talk is loosely based on the book LOGICOMIX.

Thursday, October 16, 2014

- Speaker: Dr. Josip Derado, Kennesaw State University
- Title: *What number comes after the square root of 2? —— or —— The Birth of Modern Mathematics - Poincaré vs. Hilbert Part 1*
- Abstract: This talk follows the development of modern mathematics since 1850 until the collapse of Hilbert's Program in the 1930's. It starts with the work of George Boole and Gottlob Frege and their work to establish mathematical logic. It follows with discussions on Georg Cantor and his infinities. Then we follow the mathematical war on the turn of the 20th century between Poincaré and Hilbert. Finally we discuss the work of Kurt Gödel and his solution to the Russell Paradox. The talk is loosely based on the book LOGICOMIX.

Thursday, October 9, 2014

- Speaker 1: **Dr. Andrew Izsák**, University of Georgia
- Title: *Measuring Teachers' Knowledge for Fraction Arithmetic*
- Abstract: This talk describes results of measuring content knowledge that can support reform-oriented approaches, including those identified in the Common Core State Standards, to teaching fraction arithmetic. I will present an example of such an approach to teaching fraction division and identify critical competencies that were used as the basis for generating an innovative measure of middle grades teachers' mathematical content knowledge. I will then present results of administering the measure to a national sample and discuss implications.

- Speaker 2: **Dr. Sybilla Beckmann,** University of Georgia
- Title: *A mathematician's perspective on why we need to take mathematical cognition seriously*
- Abstract: In this presentation I will show some of the surprising depth and complexity of elementary- and middle-grades mathematics, much of which has been revealed by detailed studies into how students think about mathematical ideas. In turn, research into students' thinking has led to the development of teaching-learning paths at the elementary grades, which are reflected in the Common Core State Standards for Mathematics. These teaching-learning paths are widely used in mathematically high-performing countries but are not well understood in this country. At the middle grades, ideas surrounding ratio and proportional relationships are critical and central to all STEM disciplines, but research is needed into how students and teachers can reason about these ideas. As a research mathematician it would be easy to dismiss a psychological perspective on mathematical thinking and learning, yet I have come to see its importance and I now study mathematical cognition. Although research in mathematics education is necessary, it is not sufficient for solving our educational problems. We also need a professional environment in which all of us who teach mathematics see ourselves as connected and collectively responsible for mathematics teaching, commit ourselves to learning with and from each other, and seek consensus on our practices.

Thursday, September 18, 2014

- Speaker: **Troy Schaudt**, Wolfram
- Title: *Wolfram Technologies in Education and Research*
- Abstract: This talk will be a technical seminar, including a Q&A session, on utilizing Mathematica, Wolfram|Alpha, and other Wolfram technologies for teaching and research. We'll begin with a technical overview of Mathematica, as well as briefly touching on the creation of Wolfram|Alpha. Next, we'll discuss emerging trends in technology and what is currently available (or being developed) to support those trends. Then, to give a sense of what's possible, we'll discuss how other organizations use these tools for teaching and research. Attendees with no prior experience will learn how to get started with Mathematica, thanks to improvements like free-form input and the new Predictive Interface, which anticipates your next steps and helps you quickly build up a series of calculations. Advanced users report that they learn quite a few time-saving tips and tricks from the seminar. All attendees will receive an electronic copy of the examples, which can be used as is or adapted to individual projects.

Thursday, September 11, 2014

- Speaker: **Dr. W. Gary Martin** and **Dr. Marilyn Strutchens**, Auburn University
- Title*: Developing Mathematics Teacher Leaders through Multiple Venues*

Thursday, September 4, 2014

- Speaker: **Ken Keating**, Kennesaw State University
- Title: *Introduction to Fractals and the Menger Sponge*
  Abstract: A (very) brief introduction to fractals will be given, focusing primarily on fractals created by iterated function systems (IFS fractals), such as the Cantor set, Koch snowflake, and Sierpiński triangle. The audience will then be asked to help create the blocks that will be used to build a Menger Sponge during the Kennesaw Mountain Undergraduate Mathematics Conference.