

UofL Math Gazette 2009 - 2010

The Newsletter of the
Department of Mathematics
College of Arts & Sciences
University of Louisville



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CHAIR'S CORNER



Dr. Thomas Riedel

The Department of Mathematics has had another successful year, despite the state of the economy. Most notably Dr. Ryan Gill and Dr. David Swanson were tenured and promoted to associate professors, Dr. Bingtuan Li was promoted to Professor, and Dr. Grzegorz Kubicki was awarded the degree Doctor with Habilitation by Wroclaw University of Technology; congratulations to them. We are now teaching more students and have made changes to our service courses due to other departments changing their requirements. Under the leadership of Dr. Susan White, our Dual Credit Coordinator, we have expanded on the Dual Credit Program both in terms of course offerings and in the number of high schools that participate. We look forward to continuing this expansion in support of Kentucky's goal to double the number of college graduates, and the Nation's goal of increasing the number of students with STEM degrees. The Department also is part of an NSF Robert Noyce Teacher Scholarship Program, a large federal grant that provides scholarships for students who intend to teach Mathematics or Science in high needs public high schools. More changes to education are in the works, with the new national Common Core standards to be adopted by Kentucky and 47 other states; we expect to make changes to our teacher education courses and ultimately hope to reap the benefits of better prepared students.

Due to recent budget cuts, the funding available for travel to conferences and to conduct research has decreased and thus so has the number of presentations being made; however our faculty still get invited and often obtain partial to full funding from outside sources. For example, Dr. Darji traveled to Italy last summer on paid research visits by the host institutions and is currently spending the Spring semester in Buenos Aires, Argentina. Among others: Dr. Steve Xu and Dr. Jiaxu Li visited China last summer, Dr. Kiseop Lee was on sabbatical which included a visit

to Korea with guest lectures, and Dr. Ron Sahoo was in Italy for a conference. Thanks to the generosity of many of you, we continue to offer scholarships to deserving students, and also offer funding for some of our undergraduate and graduate students to attend regional and national meetings where several of these students made presentations.

Our most recent set of graduates have all found employment. Our Ph.D. graduates: Dr. Benjamin Allgeier, Dr. Timothy Brauch (both in combinatorics/graph theory) and Dr. John Cochran (image processing) took tenure-track positions at universities in Indiana and Tennessee. We will hear from each of them in a future issue.

We are still getting many employment requests for our graduates, ranging from companies wanting to hire actuaries and analysts to statisticians. These companies often visit our department to make presentations to our undergraduate and graduate students. They have also held interviews in our offices. One local company even provides funding for students taking the actuarial examinations.

In the past few years we were not able to fill some of our vacant positions due to imposed hiring freezes. This past fall, using a different strategy of making offers earlier in the fiscal year before budget cuts paid off. We hired three new tenure-track assistant professors who will start August 1st: Dr. Csaba Biro (combinatorics) who is finishing a post-doc at the University of South Carolina, Dr. Jinjia Li (algebra) who comes from Middle Tennessee State University and Cristina Tone (probability), who is completing her Ph.D. at Indiana University. We also had a change in office staff, Stephen Altman who served as program assistant for several years and was our “front desk person” took a new position in Human Resources. We were lucky to fill the position with Mrs. Rebecca Korfhage who started in December and has quickly learned the many aspects of this position.

Finally, I would like to draw your attention to our 2010 William Marshall Bullitt Lecture, which will be given by Dr. Bernd Sturmfels, Professor of Mathematics, Statistics and Computer Science at the University of California, Berkeley.

Dr. Sturmfels is a well known mathematician with interests in many areas, and he has authored and coauthored 10 books and 175 research articles. He is currently working on algebraic methods in optimization, statistics and the life sciences. The title of this year’s Bullitt Lecture is “*Tropical Mathematics*”. The lecture will be held on Thursday March 25, 2010 at 6:00 pm in Strickler Hall 101 (Middleton Auditorium). At the beginning of the lecture, Mr. Lowry Watkins, grandson of

William Marshall Bullitt, will award the Bullitt scholarship to Ms. Brooke Houlette.

Hopefully you will find something of interest in this issue and I encourage you to contact us and let us know your thoughts. We appreciate your comments and support; if you are in the area please stop by for a visit or just check us out at our website: <http://www.math.louisville.edu>

THE ANNUAL WILLIAM MARSHALL BULLITT LECTURE

The Bullitt Lecture in Mathematics is a free, public lecture that has brought to Louisville each year, beginning in 1993, a distinguished mathematician to speak to 200-500 audience members about important and cutting-edge mathematics. The emphasis has been drawing people from outside academia. Talented high school students, area professionals, and other parties interested in the impact and excitement that mathematics has generated, especially in the last decade, have attended the Bullitt Lecture in surprisingly large numbers.

The Lecture is endowed through a grant from the family of William Marshall Bullitt, the Solicitor General of the United States under President William Howard Taft. More information about the Bullitt Lectures and the celebrated William Bullitt Collection of Rare Mathematics and Astronomy Books can be found at the website <http://www.math.louisville.edu/Bullitt/>.

BULLITT LECTURE 2010

The 2010 Bullitt Lecture in Mathematics, a free lecture aimed at the general public, will take place Thursday, March 25, 2009 at 6 p.m. in Strickler Hall 101. This year's speaker will be Dr. Bernd Sturmfels.

Bernd Sturmfels is a Professor of Mathematics, Statistics, and Computer Science at the University of California, Berkeley. A leading experimentalist among mathematicians, Sturmfels has authored 10 books and 175 research articles in the areas of combinatorics, algebraic geometry, symbolic computations and their applications. He currently works on algebraic methods in optimization, statistics, and the life sciences.



Bernd Sturmfels

Here are the title and abstract of Professor Sturmfels's talk:

Tropical Mathematics

In tropical arithmetic, the sum of two numbers is their minimum and the product of two numbers is their usual sum. Many results familiar from high school algebra and geometry, including the formula for solving quadratic equations and the fact that two lines meet in one point, continue to hold in the tropics. In this lecture we learn how to draw tropical curves and why biologists might care about this.

College and high school students, teachers, and many others from the community interested in the impact and excitement that mathematics has generated have attended recent Bullitt Lectures in large numbers. Everyone is welcome!

For more information about the Bullitt Lectures, please visit <http://www.math.louisville.edu/Bullitt/>.

FACULTY PROMOTIONS

Dr. Bingtuan Li was promoted to Full Professor.

Dr. Ryan Gill and **Dr. David Swanson** were promoted to Associate Professor.

STUDENT NOTES

Dr. Ben Allgeier graduated in Summer 2009 after completing his PhD dissertation “Structure and Properties of Maximal Outerplanar Graphs”.

Dr. Tim Brauch graduated in Spring 2009 after completing his PhD dissertation “Applications of the Combinatorial Nullstellensatz on Bipartite Graphs”.

Dr. John Cochran graduated in Spring 2009 after completing his PhD dissertation “Model Extensions and Applications in Mathematical Imaging”.

Xiao Wang won a conference scholarship to present at MWSUG 2009 at Cleveland, OH in October 2009. She also presented her work in M2009 data mining conference at Las Vegas in October 2009. She also won the title 'SAS Student Ambassador 2010' and will get the scholarship to present in the SAS Global Forum 2010 at Seattle, WA in April 2010.

Dr. Hamed Zahedi graduated in Summer 2008 after completing his PhD dissertation “Data Mining to Examine the Treatment of Osteomyelitis”.

2009—2010 MATH CLUB

This year has been a good year for the University of Louisville Math Club. We have four officers: Austin Carver (President), Cassie Bobbitt (Vice-President), Matthew Nichols (Treasurer) and Darren Jennings (Secretary). The Math Club is back and gaining strength every meeting. We started the year with monthly meetings but in the spring semester decided that a bi-weekly meeting was in order due to the growing turnout. We currently have a membership of about twenty members, including undergraduate and graduate students. We've spent some meetings learning about the research of those within the department and looking at the research being done outside of the University of Louisville. We are currently anticipating the MAA and AMS meetings in March in Lexington. In addition to all of this, we have started having sessions of learning to write in LaTeX so when we do our own research we will be able to communicate it effectively with the mathematics community. With this academic year quickly coming to a close, it is looking like next year will be another good year for growth and excitement in the Math Club.

Austin Carver
Math Club President

STUDENT HONORS/AWARDS

As always, we appreciate the kindness and generosity of alumni and other friends of mathematics. In many cases contributions were received in response to the department newsletter, the U of L Math Gazette. The department is thankful to alumni, friends and family who support the department endowments. Without your generosity, we would be unable to provide many of the offerings that make our department unique.

The **Ken F. and Sandra S. Hohman Fellowships** were awarded to Finley Freibert, Adam Jobson, Rebekah Musselwhite, and Chunwei Wang.

The **Robert J. Bickel Scholarship** was awarded to Nathan Olds.

The **C. Coleman Petty Scholarships** were awarded to Ian Philipp and Austin Carver.

The **Lois Pedigo Scholarship** was awarded to Joseph Moore.

The **Mary Ruth Brookover Award** was awarded to Katie Davis.

The **William Marshall Bullitt Scholarship** was awarded to Amanda Sutherland.

The **Graduate Teaching Award** was awarded to Adam Jobson.

The **A&S Outstanding Graduate Awards** were awarded to Tim Brauch (Ph.D.) and Christopher Caragianis (M.A.).

PUZZLE

Last year's puzzle –

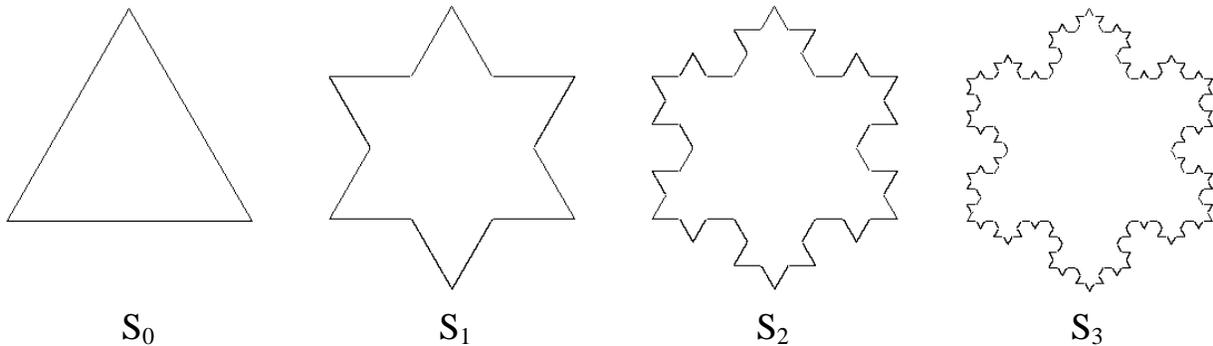
Consider a game show in which there are 3 closed doors, and you are given the opportunity to choose one of the doors and win the prize behind that door. One of the doors has a new car behind it, but the other two doors have only a glass of water behind them. The game show host knows what is behind each of the doors. Once you choose a door, at least one of the other doors will have a glass of water behind it. The host will open a door which has a glass of water behind it for you and give you the option to switch to the remaining door.

Suppose that you pick door #1. Then the game show host opens door #2 and shows you a glass of water behind it. Then the host asks you if you would like to switch to door #3. What should you do?

Solution – This is a version of the classic Monty Hall problem. You should switch to door #3 because, given the information that the car is not behind door #2, the probability that the new car is behind door #1 is $1/3$ and the probability that it is behind door #3 is $2/3$. A detailed discussion of this problem and its history is given in the recent December 2009 Mathematics Monthly article entitled “The Monty Hall Problem, Reconsidered” (pages 332–341). Some extensions of this problem are considered in the December 2009 Mathematics Monthly article entitled “Cars, Goats, π and e ” (pages 360–363).

New Puzzle

Suppose we construct a sequence of simple polygons as follows. The initial polygon S_0 is an equilateral triangle with side length 1. Then, for each positive integer i , the i th polygon S_i is defined recursively based on S_{i-1} as follows. Take each side of S_{i-1} and split it into three parts; insert an equilateral triangle pointing outwards with the middle third as the base; remove the middle third. The first four polygons in this sequence are shown below.



As we let N diverge to infinity, what happens to the area of S_N ? What happens to the perimeter of S_N ?

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_____ Student Activities
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Thanks for your generosity!