

**UOFL MATH
GAZETTE
FALL 2002**

**The Newsletter of the Department of Mathematics
College of Arts and Sciences
University of Louisville**



Department of Mathematics

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Chairman's Corner



Dr. Kevin Clancey

Fall semester greetings from the U of L Mathematics Department. We hope this letter finds you happy and well. The 2002 fall semester is in full swing with a multitude of ongoing activities. It was a great pleasure to welcome the first cohort of graduate students enrolled in our Ph.D. program. What a joy to see their enthusiasm and eagerness to pursue the highest degree in our discipline. I hope you enjoy reading the bios of some of our Ph.D. students, which appear in this newsletter.

The Department is very fortunate to have two senior visitors this semester. Professor Michael Crowe, a noted historian from Notre Dame, is visiting as part of the Arts and Sciences Liberal Studies Program. Professor Crowe is giving several lectures on campus including a joint Mathematics-Physics Colloquium entitled "A History of Vector Analysis" on November 15. Professor Harry Miller, a well-known analyst, is another senior visitor this semester. Professor Miller spends half the year in the US and the other half helping to reconstruct the mathematical infrastructure in Sarajevo.

Overall our top priority is success of our students. Remarkable mathematicians often come from unexpected places. Without question, the current crop of undergraduate and

graduate mathematics students are loaded with talent. The undergraduate mathematics students are an active group with mathematics club activities and practice for team competition. They are also continuing "The Geek Film and Pizza Series," which was started last year by Professor Japheth Wood. The Mathematics Department has the awesome responsibility of nurturing and developing the talent of students and we do everything in our power to enable the success of these students.

There has been a recent nationwide emphasis in the interdisciplinary nature of mathematical science. Perhaps this emphasis is related to federal funding initiatives. Nevertheless, the science of mathematics has always been highly utilized by other disciplines. The interdisciplinary character of mathematics is very evident in our department and many of our faculty's research efforts are related to areas such as health sciences, physics, ecology, computer science, logistics, etc. The two newest kids on the block, Professors Ryan Gill and Kiseop Lee definitely fit the interdisciplinary mold. Professor Gill works on change point methods in statistics, with applications to epidemiology and gas tank leaks and Professor Lee works on modeling options trading and hedging in the financial markets.

The Department places great value on our association with you and always looks forward to hearing from you with news items and information about your activities. You also can play a role as an advocate for the value of mathematics and especially keep young people involved in our science. I have yet to meet a person who says they studied too much mathematics. Please stop by and visit the department for any reason or drop us a line and visit our homepage www.math.louisville.edu

Best wishes - Kevin

Faculty Highlights

Dr. Robert Powers - This is my first year as **Assistant Chair** of the Department of Mathematics and I look forward to the challenges that await me. I replace Dr. Davitt, who has a new appointment in the Honors program. I have difficult shoes to fill since Dr. Davitt did a wonderful job as Assistant Chair. My main duty is to work closely with Dr. Clancey on various administrative issues. One such issue is the scheduling of mathematics classes. There is great student need at both the undergraduate and graduate levels. The department tries to meet these needs by offering a variety of classes. Unfortunately, the department can offer only a limited amount of classes due to budgetary constraints. The ideal is to strike a balance between student needs and financial constraints. My hope is to come close to this ideal as I continue to learn about the administration of the Department of Mathematics.

Dr. Udayan Darji was invited to Italy to collaborate with Professors Riccarco Camerlo of University of Turin and Professor Alberto Marcone of University of Udine. He spent a week in July in Torino after which he spent another week on the beautiful island of Ischia attending Cartemi, a biannual conference on measure theory. He was invited to participate in a special semester on set theory and analysis at the Fields Institute in Toronto. He spent a productive and fun ten days during the month of October at the Fields Institute.

Dr. Greg Rempala visited Vilnius (capital of Lithuania) for the 8th International Vilnius Conference on Probability Theory and Mathematical Statistics at Giedyminus Technical University, Vilnius, Lithuania. (June 2002)

Dr. Das attended and gave a talk at the International Congress of Mathematicians in Beijing, China in August. This meeting is held once every four years. Apart from listening to many talks on cutting-edge research in mathematics and

computer science, he also attended a talk by John Nash and climbed the Great Wall. The opening ceremony was held in the Great Hall of the People in Tiananmen Square, and was presided over by the Chinese President Jiang Zemin. Two Fields Medals (equivalent of the Nobel Prize in Mathematics) and the Nevanlinna Prize were awarded at the ceremony. The visit was partially funded by the Chinese Mathematical Society. Earlier this summer, he gave a talk at a research workshop in Cornell University, visited the Mathematical Research Institute at Ohio State and taught for the Upward Bound Summer Academy at Ohio State.

Thomas Riedel - is teaching a section of Math 107, Finite Mathematics, for the Honors Program this Fall. This class is part of a Learning Community with an Honors section of Econ 201, Micro Economics.

Steve Seif - is on leave at the Mathematics Department, Cornell University, in Ithaca, New York where he is teaching mathematics and doing research in mathematics and computer science. He is attending a Mathematics Department seminar on automata theory organized by logicians Anil Nerode and Richard Shore, and he is investigating Kleene algebras, the so-called "algebra of programs". Much of the progress in the last 10 years in Kleene algebra has been due to Dexter Kozen of the Computer Science Department at Cornell.

New Faculty

Ryan Gill is one of our two newly-hired tenure-track Assistant Professors who graduated from UT-Dallas in the Spring. Currently, he is teaching two sections of Math 109 and conducting research concerning analysis of gradual changes with applications including climate changes and epidemiology. He writes - originally, I was born in Orange, CA and later moved to Austin, attending Westlake High School. My parents

now live in Kingsland, TX, and my twin brother lives near Los Angeles, and a younger sister lives near Miami. Outside of work, I enjoy playing basketball as well as many other sports.

Kiseop Lee - One of our recent hires as a tenure-track Assistant Professor, received his BS in Mathematics in 1995 at Seoul National University; MS Statistics in 1997 at Seoul National University. In 2002 he received two degrees: the MS in Computational Finance and Ph.D in Statistics at Purdue University. He writes:

My research includes hedging and pricing in incomplete markets and stochastic integro-differential equations. I am currently teaching an undergraduate level course with graduate level number. Interesting course to teach, since we can use a lot of interesting examples, than in Algebra or Calculus.

I am married with one daughter and one sister. My hometown is Seoul, Korea. I am a die-hard baseball and football fan. I used to ski, but not anymore after I came to the USA – too flat! I am now learning to play golf. I also enjoy cooking. I chose Louisville because of the people – nice people, very warm and open minded.



Bullitt Lecture 2003

Carl Pomerance will present the Bullitt Lecture on April 4, 2003 at 7 pm in Strickler Auditorium 101. This year's Bullitt Lecture will be presented by Professor Carl Pomerance from Bell Labs, at Lucent.. His research interests are in Analysis (Real and Complex), Mathematics of Computation and Number Theory. Dr. Pomerance is one of the world's top

number theorists. He received his PhD from Harvard University (under John Tate) in 1972. After graduating, he immediately joined the faculty at the University of Georgia, becoming full professor in 1982. He has won many teaching and research awards, including the Chauvenet Prize in 1985, MAA's distinguished university teaching award in 1997, and the AMS's Conant Prize in 2001. He has over 120 publications, and is the author (with R. Crandell) of "Prime numbers: a computational perspective", Springer-Verlag, 2001.

Bullitt 2002

Last March our annual Bullitt Lecturer was Dr. Keith Devlin of Stanford University. Dr. Devlin is the author of several popular books on Mathematics such as *The Math Gene: How Mathematical Thinking Evolved* and *Why Numbers are like Gossip*. He also speaks about mathematical topics regularly on National Public Radio (he is known as "the Math Guy" on the popular Saturday morning magazine program *Weekend Edition*, with Scott Simon) Over 500 people attended Dr. Devlin's lecture on **New geometries of animals, flowers, art, and the human body**. Afterward Udayan Darji, Steve Seif and then Math Club co-presidents Melissa Baker and Eric Gorenstein took him barhopping on Bardstown road.

Putnam Competition

The William Lowell Putnam Mathematical Competition began in 1938 and is considered to be the most prestigious mathematical competition for undergraduate students in the United States and Canada. This year it will be held on Saturday, December 7. It consists of two sessions of 3 hours each. Students will try to solve 12 problems, mostly interdisciplinary involving calculus, geometry, probability, number

theory as well as some concepts from group theory, set theory, graph theory and linear algebra. In 2001 there were more than 2500 participants from more than 400 colleges and universities. The three top teams were Harvard, MIT and Duke University. This year four students (**Ben Allgeier, Alyssa Cramer, Eric Gorenstein** and **Adam Jobson**) who are being coached in weekly meetings in the Department will represent UofL. These students also participated in the Virginia Tech Regional Mathematical Competition held on the last Saturday of October. Let's wish them good luck in both trials. For more information, please contact Professor Grzegorz Kubicki.

Welcome PhD Students

Jeremy White - I spent most of my childhood here in Louisville. I attended Atherton High School and earned my Bachelor's Degree from Colgate University May 1998. I started into the Master's in Mathematics program at UofL with intentions of teaching high school mathematics. However, my studies so far, especially my work on my Master's thesis under the guidance of Dr. Robert Powers, have fascinated me. I begin to get a feeling of "un"-satisfaction with the idea of stopping my studies of mathematics at the Master's level. While finishing up my Master's Degree in the Spring 2002 I decided to continue my studies in a doctoral program.

Outside of mathematics, I spend a fair amount of time perfecting my talents as an endurance athlete. I swim with a local swim club. I enjoy running and road cycling. I try to make time for a few weight training sessions per week as well. I have several family members who live in the Louisville area. I enjoy seeing my family often. I definitely consider Louisville my home.

Joseph Twagilimana - I was born in RWANDA, Central Africa, in 1960. I lived in RWANDA until 1994 when I

became a refugee in SENEGAL, West Africa. I left SENEGAL in 1998, resettled in the USA, where I was granted asylum. I am married, father of three daughters, 15, 10 and 4 years old.

I received my Bachelor's degree in Mathematics at Rwanda University, and my Master's degree in Mathematics at UofL 2002. My motivation for the PhD in mathematics is my love for mathematics and desire to push my knowledge in Mathematics as far as I can. I love abstract Mathematics but I also am excited by applied mathematics such as Actuarial Mathematics, Economics and Statistics.

Wendy Xu. I was born and grew up in China. I studied biology in college. In Fall 2000, I got a Chancellor's Fellowship from University of California, Riverside, and came to the US as a PhD student in biology. I moved to Louisville in Spring 2001, and I found myself not happy doing biological research, but more intrigued by topics with more logical certainty. I entered the Math Department at UofL in Spring 2001 and received my Master's degree in May 2002, and decided to continue in the Ph.D. program.

Right now I don't have a focus in research. I like Algebra but mathematical biology is also interesting to me. It's amazing to see that biological phenomena are modeled so well by mathematical modeling. I would love to do some work in it. I am also taking the Actuarial exams. Calculating is fun.

I like music, playing badminton, ping pong, watching movies, and cooking. I also enjoy traveling.

Lou Zulevich – I was born in San Juan, Puerto Rico, but raised and lived in Kentucky most of my life. I work for the US Postal Service and have been with them for 21 years. I decided to further my education more or less as a hobby. I received my BS degree from Western Kentucky University in Dec. 1998 with double majors in Math and Physics. I received my Physics MS degree from U of L in Aug. 2002.

I enjoyed attending UofL and decided to continue my education with the Math PhD program. I enjoy long distance running. I have run 6 marathons, and even completed the Louisville 50 miler in 1998. I have done two Olympic distance triathlons and hope to accomplish a full Ironman triathlon.

Yan Xiong - I come from a strong and beautiful country CHINA. In 2000 I got my BA in Economics at Shanghai University of Finance and Economics. After graduation I have worked in Marketing Services, Ltd. and a famous Financial Research Institute for two years.

My interest is to conduct research on the application of statistics to social science like economics and finance, where I can put my knowledge of economics into statistics research. Upon completion of my study, I would devote myself to scientific research and turn my research achievements into practical use. My hobbies are movies, sports and traveling.

Fariba Nowrouzi Kashan - I was born in Iran. I got my first Master degree on Arts/Economic in Tehran, Iran in 1995. I was high school mathematics teacher for more than 10 years. I came to U.S.A. after getting married in 1997, and I got my second Master's degree in Art and Science/Mathematics at University of Louisville in December 2000. Now I am really happy that I have this opportunity to continue my study as a Ph.D. student in the mathematics department at University of Louisville. I hope to specialize in the field of Biostatistics-Decision Science.

Michal Czajkowski - I was born and grew up in Poland. In 2001, I received my master's degree in Mathematics at the Warsaw University of Technology. My specializations were financial and insurance mathematics. The subject of my MA thesis was "Actuarial Model Risk of the Optimal Increase Limit in the Insurance Firm's Capital". After I received my master's degree, I then decided to continue my education and

pursue a PhD. I began in Warsaw but later made the decision to finish in the United States per a suggestion made by one of my professors in Poland. In the future, I would like to pursue a career in insurance because I have an interest in insurance risk and actuarial modeling; however, mathematics is not my only interest. I enjoy swimming (I have a lifeguard license, and a diver III-rd degree license), roller-blading and theatre.

Department Visitors this Fall

Sherwin Kouchekian - I was born in Tehran -- Iran. Later on, during the high school years, I moved to Sweden. I attended the Royal Institute of Technology-Stockholm where I received my Master of Science degree in Engineering Physics specialized in Applied Mathematics. My Master's thesis was received in August 1992 under Lennart Carleson with title "A Study of the Mandelbrot Set." In September 1994 I entered the University of Tennessee at Knoxville to pursue the Doctor of Philosophy in Mathematics. The doctoral degree was received in August 2000 under John B Conway. Also in August 2000, I accepted a two-year Postdoctoral position at the Virginia Tech University.

Greg Bell - I was born in Panama City, Florida. I was in a military family, so we moved frequently; we lived in Italy, Germany, as well as other cities in Florida.

I attended the University of Florida in Gainesville and got all my degrees (Bachelor's, Master's and Ph. D.) there, working with Sasha Dranishnikov. Although I'm trained as a topologist, I work mostly in geometric group theory using the coarse geometric approach to finitely generated groups.

I'm teaching Calculus I and Euclidean and non-Euclidean geometry this semester. My wife Santiya and I live in St. Matthews with our yellow lab, Cody, and enjoy cooking, watching formula one racing, hiking and mountain biking.

Marti Zimmerman - I chose Louisville because it is home.

I graduated from Western Kentucky University with a major in Mathematics and a minor in Chemistry. Into the mix of math and chemistry I received my Kentucky Teaching Certificate. After getting married I returned to school to attain a Master's degree - this time at the University of Louisville. After receiving my degree I took a few years off to raise our three children.

When I returned to teaching I taught part time at Spalding University. I then moved over to the University of Louisville two years ago again as a part-time instructor. Dr. Kevin Clancey offered me a full time position in the Spring semester of 2002 to coordinate and teach the new Math 111-E course. Dr. Clancey could not have known it but I believe I have been preparing for this opportunity my entire professional career. (Math 111-E is a course designed for those incoming freshmen who just miss the cut off point on the ACT and would have to take Math 080. The course is 'enhanced' by meeting for 5 fifty minute meetings per week.) I enjoy the freshmen-age student, the challenge of 'beating back' math phobia, the opportunity to help marginal math students learn the basics, and to be a friendly advocate for those 'terrified' of mathematics.

Ruth Brackebusch -I was born in Battle Creek, Michigan, the third of 6 children. My father was an army doctor and we lived in Japan, Texas, Oklahoma, France and California. When he retired from the army, we settled in Eugene, Oregon. My bachelors degree is from the University of Oregon, my masters degree from Michigan State University and I earned a Ph. D. from the Ohio State University where I was a student of Gerald Edgar. I was a professor at University of Louisville and Indiana University Southeast, then a stay-at-home mom with two children. I've come full circle and am back at the University of Louisville. It is interesting to see that some of my

former students at Indiana University Southeast are now graduate students in mathematics here. I'm currently teaching Calculus I & II and working on research in Banach spaces.

Awards and Stuff

George Barnes won the Provost Exemplary Advising Award and also was the National Academic Advising Association Outstanding Advising (NACADA) Certificate of Merit recipient in faculty academic advising.

Visitor **Greg Bell** won the Math Department's "Excellence in Teaching Award" at the University of Florida this past year.

Manav Das received a plaque for outstanding efforts in teaching at the Ohio State Upward Bound Summer Academy.

Beth Bradley won a Kentucky Science and Engineering Foundation (KSEF) grant of more than \$60,000 for work on antibiotic resistance in the Intensive Care Unit.

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Grzegorz Kubicki and **Robert Powers** of Mathematics were promoted to the rank of full Professor.

Kiseop Lee won the I.W.Burr Award for an outstanding Ph.D student at Purdue University before joining UofL this summer.

Bingtuan Li - received two grants: a National Science Foundation Grant of \$75,384 for three years; an Oak Ridge Associated Universities Ralph E. Power Junior Faculty Enhancement Award of \$10,000 for a year.

Grzegorz Rempala of Mathematics was promoted to the rank of Associate Professor with tenure.

Richard Davitt has been appointed a Distinguished Honors Scholar, a three year appointment with the Honors Program. He also won the 2002 A&S Distinguished Service award.

Wiley Williams was Co-PI on a National Science Foundation grant awarded \$849,968, "Louisville Area Science and Mathematics Alliance for Recruitment and Teacher Reform."

This 3-year NSF grant will provide funds for the development and initial offering of three new or revised Mathematics courses, two Biology courses, and one Chemistry course designed especially for middle and high school teachers. It will also fund efforts to recruit more middle and high school mathematics and science teachers, both from within the UofL student body and from prospective teachers outside UofL.

Grzegorz Kubicki gave two talks (1) "Best secretary problem on partially ordered sets; counting tree embeddings" during the International Workshop on Optimal Stopping and Stochastic Games, Bedlewo, Poland, July 1-7, 2002. (2) "A linear algorithm for finding the reinforcement number of a tree" at the 35th Midwestern Graph Theory Conference, Illinois State University, Sept. 27-28, 2002.

Distinguished Visitors for Fall

Dr. Harry Miller, is a Visiting Professor this Fall. His research interests overlap with several members of the Mathematics Department; in particular in the areas of Functional Equations and Real Analysis. Professor Miller has taught at DePaul University (Chicago), the University of Michigan, Bilkent University (Ankara) and the University of Tennessee at Chattanooga- where he served as Head. He spent, together with his wife (also a mathematician), many years teaching at the University of Sarajevo. He continues to be a Professor in Sarajevo as well as being the Chief Editor of the international mathematics journal *Radovi Mathematicki*. His two adult daughters, Lejla and Alica are also mathematicians.

Professor Miller and his colleagues in Sarajevo are attempting to rebuild the Mathematics Department of the

University of Sarajevo. University life and intellectual pursuits in general were ravaged by the war of aggression waged against Bosnia from 1992 until 1995. He, together with professors in the Computer Science and Engineering Department of UofL are in the planning phases of organizing a Master's degree program in Computer Science for Sarajevo students.



Dr. Michael Crowe is one of the Distinguished Scholars in Residence at the University of Louisville this Fall. He is associated with the Liberal Studies Program, is hosted by the Department of Mathematics and co-teaching with Professor Richard Davitt a course on Scientific Revolutions in the Honors Program. He has taught at the University of Notre Dame since 1961, where he is now the John J. Cavanaugh Professor Emeritus of the Humanities in the Program of Liberal Studies and Graduate Program in History and Philosophy of Science.

He will present “A History of Vector Analysis”, Friday, November 15th at a joint Mathematics/Physics Colloquium. at 3:00pm in Natural Sciences 112.

Abstract: In the 1840's, two mathematicians, William Rowan Hamilton, an internationally prominent Irish mathematician, and Herman Grassmann, an almost unknown high school teacher in Pomerania, published systems of vector analysis,

either one of which could have led to the modern system of vector analysis that is so widely used in mathematics, physics, and many areas of engineering. This talk answers the historical question of which system did lead to our modern system, and raises questions about how mathematics develops. In tracing this history, we shall look especially at the contributions of Peter Guthrie Tait, James Clerk Maxwell, Josiah Willard Gibbs, and Oliver Heaviside.

This talk is based on Crowe's book, *A History of Vector Analysis: The Evolution of the Idea of a Vectorial System*, which was awarded a Jean Scott Prize by La Maison de sciences de l'homme in Paris and has been in print for over thirty years

Professor Valeriy Faiziev, of the Tver State Agricultural Academy visited Professor Sahoo during the month of October to conduct collaborative research on pseudocharacters and their applications. Professor Faiziev graduated from the Moscow State University in 1991. Prior to joining Tver State Agricultural Academy, he worked at the Institute of Mathematics, Tajik Academy of Sciences (Tajikistan) from 1991 to 1996. Professor Faiziev presented a colloquium talk at the department.

Puzzle

(presented by Grzegorz Kubicki during the Undergraduate Assembly in September)

Ten goblins were captured by Dracula. Next day they will face the following trial: Dracula will put either red or blue hat on

each goblin's head. Each goblin will see the colors of the remaining nine hats (but not his own). Dracula will ask each goblin the same question : "What is the color of your hat?" . The possible answers are only "red" or "blue". If the answer is correct, then a goblin is saved. If the answer is wrong, a goblin is killed. The goblins have a whole night to come up with a strategy that will save as many of them as possible. What strategy should they use? How many of them can be saved for sure?

Note: due to a computer crash, the last puzzle solvers names are temporarily unavailable, so we will wait until the next newsletter to publish the answer.

The Math Club chose its officers for the 2002-03 academic year.

President: John Schwarz
 Vice-President: Eric Gorenstein
 Secretary: Kelly Nooning
 Treasurer: Adam Marlowe

The Math Club is continuing the Geek Film Series. They have already screened "A Beautiful Mind", "Enigma" and "Searching for Bobby Fischer", says faculty advisor Dr. Udayan Darji.

Student Honors/Awards

Two of our PhD students, **Jeremy White & Paul Houpt**, have been awarded University Fellowships.

2002 Mary Ruth Brookover Award in Mathematics was awarded to senior Fumiko Futamura, who has gone on to study at Vanderbilt University.

2002 Robert J. Bickel Scholarships were awarded to:

Laura Dyan Whitenack	rising senior, math major
Alison Diebold	rising junior, math major
Marci Dailey	rising junior, math major
Benjamin Allgeier	honorable mention
Melissa Baker	honorable mention
John Swartz	honorable mention

2002 C. Coleman Petty Scholarships were awarded to:

Alyssa Cramer	outstanding incoming freshman
Lindsey Pierson	freshman, math major
Erin Mulrone	honorable mention



Commons Room

The Mathematics Department has moved to new office space on the 3rd floor of the Natural Sciences Building. We like our new space, which is nice and bright and has a lot more room than the space on the 2nd floor. As a result of this move many faculty played musical offices and also increased the square footage of their domains. We hope that you can come by and pay us a visit in our new environment.

There is one aspect of this move that remains. We are in the fortunate position of having a great space available that can be shaped into a “Mathematics Commons Room.” This space is a 739 square foot former geosciences lab on the 3rd floor of the Natural Sciences Building. As you are well aware, many great breakthroughs are a result of collaborative discussions and serendipity. We learn mathematics from encounters with each other and dialogue with faculty is a key to student learning. This collaboration and dialogue requires a warm comfortable environment. Realistic scenes in movies like “Good Will Hunting” or “A Beautiful Mind” demonstrate the life of a mathematics department is enriched by having gathering places for students, faculty and staff.

The department has paid to have this room cleaned out (including asbestos abatement). We are in the process of raising funds for a new ceiling, painting, carpeting and furniture. The total costs are on the order of \$50,000. It is never easy to ask for funds, but we would appreciate your help in finishing off the commons room. For your convenience, we have attached a donor card in a self-addressed envelope. Your tax-deductible gift will be a long-lasting contribution to the life of our department and to students studying mathematics at UofL. Some of you may also receive a separate letter from a mathematics department alumnus about this matter. We thank you in advance for your generosity and will acknowledge all contributions to the commons room. - **Kevin**

