

# DEPARTMENT OF MATHEMATICS NEWSLETTER

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"All the v's that's fit to print"



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## Ph.D. in Applied Science with Emphasis in Mathematics Established

In September, the University of Colorado Board of Regents officially approved the Ph.D. in Applied Science at UCCS. The UCCS math department is participating in this interdisciplinary Ph.D. degree, which includes tracks in Physics and Bioenergetics as well, and complements the University's existing doctoral programs in engineering and computer science. Close contact with all of these departments will promote interdisciplinary research and educational opportunities. The math department's Ph.D. committee consists of Drs. Carlson, Chakravarty, and Morrow. For information about this program, contact the math department office at 719.255.3311.

## Two new department members!

The department welcomed two new members this fall: **Dr. Barbara Prinari**, and **Dr. George Rus**. Check out the profiles of Barbara and George further down in the Newsletter!

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## Lorch Memorial Scholarship Established

The family of former UCCS Professors Bob and Barbara Lorch has generously established the Robert S. and Barbara R. Lorch Department of Mathematics Endowed Scholarship. The late Drs. Lorch taught political science and sociology, respectively, for more than 30 years. Bob and Barbara's son John earned a B.A. degree in mathematics at UCCS in 1988. The funding provides for merit-based scholarships for junior or senior math majors.

In the first year of its establishment, the math department awarded Lorch Scholarships to **Jenna (Kapit) Barnett** and **Tim Lewkow**. Jenna has attended UCCS since August 2006, and will graduate this upcoming May with both a math degree and a teaching license in the secondary education field. She plans to teach high school math in the Colorado Springs area, and hopes to return to UCCS in the near future to pursue her master's degree. Tim also expects to earn his math degree this coming May, and then plans to attend graduate school to study Computational Science. After that, he would like to continue in research and development in an industry involving computational science, engineering, or mathematics. (Some of Tim's recent additional activities are profiled in the paragraph about Dr. Chakravarty.)

Congratulations to both Jenna and Tim on this recognition. (Congratulations also to Jenna on her wedding last summer!) And of course a special thanks to the Lorch family for the establishment of this scholarship fund, which will be used to support UCCS mathematics students in perpetuity.



## 2009 Outstanding Student Awards

The following mathematics students were honored for academic achievements during the 2008/2009 Academic Year by the College of Letters, Arts, and Sciences:

**John Chartier** was named the recipient of the Outstanding Undergraduate Student in Mathematics award. **Joseph Montgomery** was named the recipient of the Outstanding Graduate Student in Applied Mathematics award.

Congratulations to John and Joseph for all of their hard work !!

# Around the Department

In alphabetical order...

**GENE ABRAMS** continues to do research in the area of Leavitt path algebras. He spent two weeks in January on a research visit to the University of Málaga (Spain), and in April gave a series of lectures at his PhD-alma-mater (University of Oregon) on this topic. Gene also spent time involved in teaching and learning endeavors. As part of the UCCS P.I.P.E.S. program he helped deliver the first Pikes Peak Math Teachers' Circle Academy and Seminar. The Academy was a four-day intensive course in June (in Breckenridge; nice!). The purpose was to give middle school math teachers some experience with various problem solving techniques, which they can then use in their own classrooms. The Seminar is an ongoing series of dinner meetings at which the teachers report on various activities they have implemented in their classrooms.

**BOB CARLSON** continues his research, which blends differential equations and graph theory. Early in the year he completed a paper which uses these themes to link a classical problem of numerical integration to special functions on graphs. This fall he attended an American Mathematical Society regional meeting at Baylor University, where he gave a talk on related material. In a case of research interests blending nicely with teaching and learning, Bob is planning to offer a senior/graduate level course on graph theory next summer. In addition, he is chairing a committee charged with developing policies for the mathematics.

“Sarby also supervised the research work of mathematics major Tim Lewkow on the line-soliton solutions of the Kadomtsev-Petviashvili equation. A joint paper on this work has been recently accepted for publication.”



**RADU CASCAVAL** participated in several research meetings during 2009. He attended the First Annual Mountain Lion Research Day at UCCS in April, with a poster presentation. He traveled twice to the University of Georgia (in March and in August) to give presentations in international conferences organized by IMACS (the International Association for Mathematics and Computers in Simulation). He also gave a research presentation during the AMS meeting at Baylor University in October. Another highlight of this past year for Radu was the effort that he put into promoting undergraduate research in mathematics at UCCS. He coordinated the efforts of several faculty to put together an NSF REU Site Proposal (REU stands for Research Experiences for Undergraduates) to begin June 2010. He also visited an existing REU site at Brigham Young University and gave a student talk to the REU students. He involved an undergraduate student in research since July 2009, with funding from a CRCW grant. He has also started an Honors section of the Linear Algebra Course in Fall 2009, with the declared goal of attracting very good students and put them in a research path early on.

**SARBARISH CHAKRAVARTY** continued his research work on integrable systems and published three articles on this topic during AY 2008-9 jointly with his collaborators. He gave a talk at the International Conference on Microwave Magnetism (ICMM2008) at CSU, and organized a session on “2-d solitary waves in shallow water” at the IMACS Conference on Nonlinear Evolution Equations and Wave Phenomena at Athens, GA. Sarby also supervised the research work of mathematics major Tim Lewkow on the line-soliton solutions of the Kadomtsev-Petviashvili equation. A joint paper on this work has been recently accepted for publication. Tim presented his work at several regional student research conferences, presented a poster at the IMACS Conference in Athens, GA, and was awarded an LAS undergraduate research scholarship in 2008-9. He also gave an invited student presentation at the 2009 SIAM Annual Meeting. Tim represented UCCS which was one of the six institutions selected by SIAM for student presentations, one student from each institution. The other universities were Arizona State University, Columbia University, Oxford University (UK), Tufts University, and University of Illinois at Urbana-Champaign.



## Continued



**JIM DALY** continues to do joint research work with colleagues in the Hungarian school of harmonic analysis. Together with Professor Sandor Fridli, Jim submitted a paper entitled: The dual spaces of certain Hardy spaces on  $\mathbb{N}$  and  $\mathbb{R}$ . Work continues on Sidon inequalities to extend some multiplier operator results. Jim's official **RETIREMENT** from teaching begins at the end of this academic year, after 26 years on the faculty at UCCS. (Jim says that he's got a number of kayaking and backpacking trips planned.) He will continue at UCCS for a few years as a research professor of mathematics.

Math Learning Center Director **JENNY DORRINGTON** spent the year looking for ways to expand services offered by the MLC, and to increase the number of students using the center. In the spring, she hired and trained the first four Supplemental Instruction leaders for 100-level classes, and has continued building an S.I. program for these classes (in conjunction with the SI already offered by the department). The MLC is seeing more and more visitors, with some days at capacity for much of the day. The tutors continue to do a great job meeting the demand and keeping their senses of humor.

Challenges this year included teaching the Higher Geometry course to the mixed group of undergraduate and graduate students that take the class. It's the most diverse group of students (mathematically) that she's ever had in one room! She also taught both an introductory graduate course in Topology and an independent study in Algebraic Topology, both of which were a lot of fun and served to remind her about why she loved math in the first place (as well as about just how much a person can forget ...) She had the chance to take a road trip to California to visit her brothers, and got to spend time with her youngest niece. She's looking forward to a slightly more exotic trip next summer.

This year **SHANNON MICHAUX** had several changes occur. Starting in the Spring 2009 semester, she changed increased her official university appointment to 70% time. During the 2009 calendar year she taught 24 credit hours. Included in these hours was a section of a course called "Numbers", as part of the UCCS Freshman Seminar. It was very interesting for her to get to know some of the incoming freshmen and to have the chance to teach a course with content from many different disciplines. Shannon also received a promotion to Senior Instructor this year.



## 2008/2009 Math Department Graduates!

Here is the list of the Academic Year 2008/2009 graduates from each of the department's degree programs. Congratulations to the following students:

### B.A. Mathematics:

Greg Bliss  
Jesse Broin  
Kelly Hagen  
Aaron Smith  
Ashlea Weatherman

### B.S. Mathematics:

John Chartier  
Christina Tursich

### M.S. in Applied Mathematics:

Merida Bass  
Matthew Gerholdt  
Steven Hartmann  
Robyn MacIvor  
Josph Montgomery  
Jason Ocvirk  
Jeremy Riehl



“Earlier in the year Greg co-organized and hosted the 2009 Pikes Peak Regional Undergraduate Math Conference (PPRUMC).”

## Continued

This past summer, Department chair **GREG MORROW** traveled to Graz, Austria, to deliver a paper on "an asymptotic evaluation of the last passage time constant in high dimensions". His talk was part of a Memorial Conference for his PhD advisor, Professor Walter Philipp. Greg had a chance to meet old friends and colleagues and catch up with Walter's other students. Graz is very green and charming, with the loudest noises being the birds that inhabit a forest-like atmosphere in and around the town. Earlier in the year Greg co-organized and hosted the 2009 Pikes Peak Regional Undergraduate Math Conference (PPRUMC). This conference is supported by the MAA, and attracts undergraduate talks in mathematics from throughout a very wide region. The 2010 PPRUMC will be held at CSU Pueblo. Greg is again working with Radu Cascaval and several other members of the department to attract national funding for undergraduate research in a summer resident program in math at UCCS.

Although **K.M. RANGASWAMY'S** retirement became official in June, he was quite active during the entire year! Ranga visited the University of Málaga for three weeks in May to do joint research with Professors Gonzalo Arando Pino and Mercedes Siles Molina which resulted in a paper entitled "Self-injective and weakly regular Leavitt path algebras." In addition, Ranga finished a paper jointly with Gene Abrams and Mercedes Siles Molina on the socle series of a Leavitt path algebra.

On a personal note, In September Ranga undertook a three week pilgrimage to the highlands of Tibet which included a dip in the alpine Lake Manasarovar (situated at 15000 feet), and a 32 mile, 3 day circumambulation of the holy Mount Kailash. (The Mount Kailash trail starts at 15000 feet, and climbs to 18,600 feet during Day 2, and then descends back to the starting point.) "The night skies at those heights were unbelievable!"



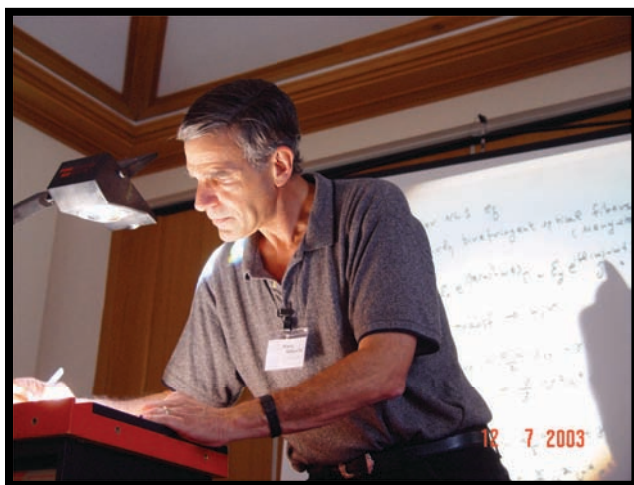
Researchwise, the high point of the past year for **RINALDO SCHINAZI** was his collaboration Professor Tom Liggett of UCLA. Rinaldo was able to interest Professor Liggett in one of the models that Rinaldo had created, and the resulting research interaction was great! (Except, Rinaldo notes, that "... his answers were very brief, and I had to work very hard at them." And, on top of that, the referee of their joint article made them completely rewrite it ...) Additionally, Rinaldo had a chance to attend and present some of his research work at a conference in Berlin in July. He gave a talk, met with friends and colleagues, and generally had a great time. (The only disappointment about the conference was that "... there were too many talks about finance for my taste. Someone should tell them that their models do not work!")

In 2009, **YU ZHANG** had a chance to again visit Kobe University (Japan) as part of a research collaboration. Yu and two colleagues at Kobe are in the process of writing a long paper about the critical behaviors for the Ising model.





## Distinguished Lecture Series



During 2009, the Department of Mathematics established a prestigious Annual Distinguished Lecture Series, to be held in early Fall semester. This event is integrated within the Math Colloquium Series (which has been running for almost three decades!). The goal of the Distinguished Lecture Series is to bring world-renowned mathematicians to UCCS to deliver an enriching experience to our students and faculty, by exposing them to current topics of research in mathematics and applications. These lectures are also intended to stimulate dialogue and

cultivate an atmosphere of collaboration between faculty across disciplines.

The First Distinguished Lecture was given by Dr. Mark Ablowitz on October 8. His lecture was entitled: "Extraordinary Waves: From Beaches to Lasers". The event was extremely well attended, with over 75 faculty and students in attendance. Dr. Ablowitz, of the Department of Applied Mathematics at the University of Colorado at Boulder, is considered a pioneer in applied mathematics, and his work in the field is among the most highly cited in the world. He is best known for his landmark contributions to the "inverse scattering transform," or IST, a method used to solve nonlinear wave equations. Mathematicians and physicists have used the IST to gain a better understanding of phenomena such as water waves. Professor Ablowitz joined the CU-Boulder faculty in 1989.



## Video Course Archives

**Dr. Cascaval** continued his involvement with the process of putting many of the UCCS math courses on video archive. To experience some of these courses, check out <http://www.uccs.edu/~math/vidarchive.html>.

Radu designed and administered a survey given to all users (2500+ worldwide) and collected a remarkable amount of feedback. A raffle at the end of the survey selected the winner of an iPod Touch, who happened to be all the way from Rehovot, Israel.



# Welcome

## New Faculty Profiles

### Dr. Barbara Prinari

The UCCS Math Department welcomes Assistant Professor Barbara Prinari to its family.

Barbara grew up in Lecce, a city of nearly 100,000 people in the heel of the boot of Italy. The paths she has taken which have eventually led to a career in mathematics, and to a life in Colorado Springs, have had a number of branch points. Although as a teenager she enjoyed philosophy and literature, and thought studying English as her main focus, she instead “went with the flow of the life stream” and attended a scientific high school. In her college studies, she again rode the life stream (followed a boyfriend?) and became a physics major at the University of Lecce. By her third year her passion for physics had increased exponentially (passion for the boyfriend went the other direction). A husband and wife team of physics professors at Lecce took her ‘under wing’, and helped convince her to chart a career in academia.

Barbara earned her Ph.D. in physics in 1999. (So there are now two math department faculty who hold PhD’s in physics, Barbara and Sarby.) An opportunity to study at CU Boulder in Mark Ablowitz’ applied mathematics group opened up at that time, so Barbara spent her first six post-PhD months in Colorado. She then returned to Lecce and assumed a position as assistant professor of physics, a position she held until joining the UCCS faculty this fall. (Barbara notes that the physics department had a very large, strong group in mathematical physics, so the transition to a mathematics department was completely seamless.)

Barbara has enjoyed her time so far at UCCS. She notes that the people have been “really willing to help”. She’s teaching Calculus 1 this fall, and will teach both Calc 1 and Complex Variables this coming spring. Her research focus is in nonlinear partial differential equations, specifically inverse scattering transforms.

Barbara enjoys doing yoga in her spare time. She also very much enjoys baking and cooking. (Author’s note: Barbara often will bake up some delicious cakes or cookies or pies and bring them to the math office for all to share. The author has been making many trips to the math office this semester ...)



### Dr. George Rus

The UCCS Math Department is also fortunate this semester to welcome Dr. George Rus to its family. George is Instructor of Mathematics.

George was born and raised in Bucharest, Romania. He had both an interest and an ability in mathematics from early on. (He recalls that when he was still just a first grader, he would do his older brother’s 3<sup>rd</sup> grade math homework for him!) During his high school years, when he found himself volunteering to participate in Mathematics Olympiads on Sunday mornings at 8:00, he knew a career in mathematics was in his future.

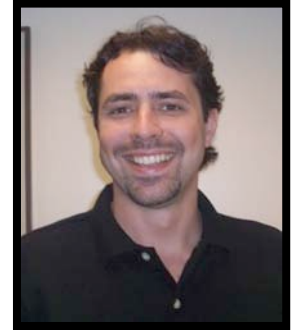
In the Romanian system, students know by the time they enter college what subject they will study for the next four years. George attended a math-oriented university, and essentially took nothing but math courses during his entire undergraduate career.

Once out of college and looking for the next step in his life path, George decided to pay a visit to his older brother, who had moved to Illinois a few years earlier. The visit turned into a long-term commitment! George completed a Master of Science in math at Western Illinois University. During his master’s level studies he was able to not only reconnect with his “inner math student”, he also realized how much he enjoyed teaching math as well.

Once so hooked, he decided to pursue his Ph.D. A research collaboration connection of his MS advisor at WIU let George to study at the University of Wisconsin at Milwaukee, where he completed his doctorate degree in numerical analysis just this past fall.

George is teaching precalc, calc 1, and numerical analysis during Fall 2009. In the spring he’ll teach two calc courses, plus differential equations (offered in *MathOnline* format). He’ll also teach some *MathOnline* courses next fall as well.

Outside of mathematics, George plays a lot of basketball. He enjoys all sports, and especially looks forward to the ski season. George is part of a husband-and-wife team of professors; his wife Gina is an instructor in the UCCS Department of English.





## KEEP IN TOUCH!

Let the UCCS Math Department know what  
you've been up to.

Send us your information:

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