



Department of
MATHEMATICS



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

Ph.D. in Applied Science
(with emphasis in mathematics)

In September 2009 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 both Physics and Mathematics. 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.

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NEWSLETTER

VOLUME 14, NUMBER 1

Outstanding Student Awards

During "end of year awards ceremonies" in May 2010, the following mathematics students were honored for academic achievements during Academic Year 2009/2010 by the College of Letters, Arts, and Sciences:

Taylor Sullivan-Hope and **Tim Lewkow** were named the co-recipients of the Outstanding Undergraduate Student in Mathematics award. **Gregory Hatten** was named the recipient of the Outstanding Graduate Student in Applied Mathematics award.

**Congratulations to Taylor, Tim, and Gregory
for all of their hard work!**

News Inside

A New Department Member!

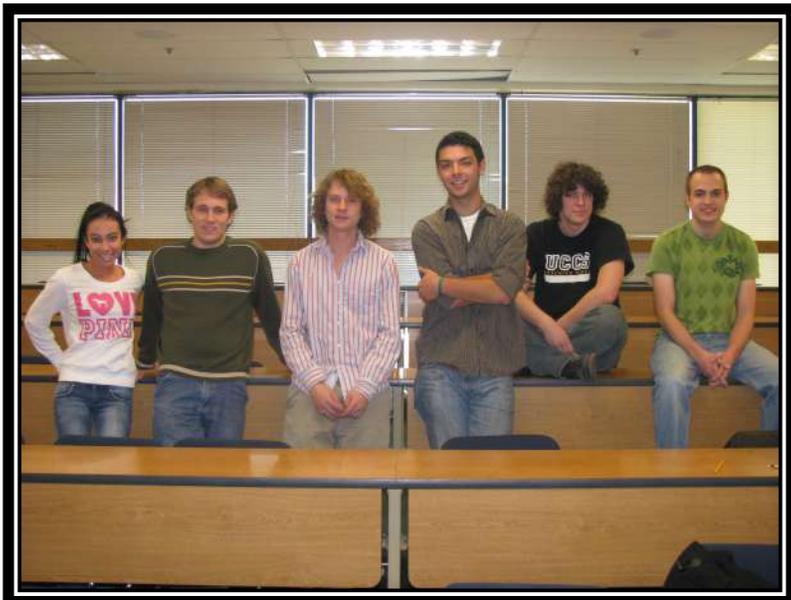
Dr. Zachary Mesyan

The department welcomed **Dr. Zachary Mesyan** as a new Assistant Professor this fall. Check out the profile of Zak further down in the Newsletter!

DECEMBER

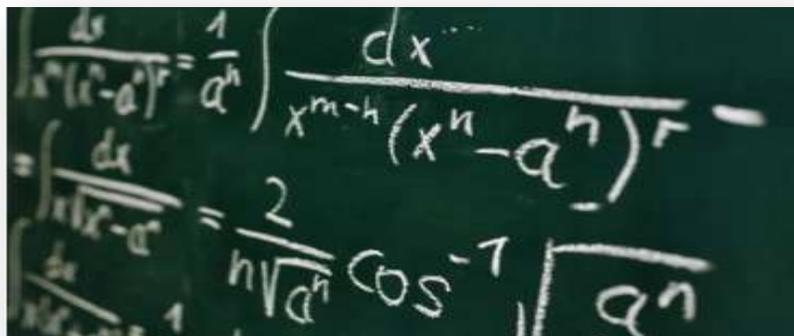
2010

Math Student Recognition and Accomplishments



2010 UCCS Putnam Exam Team:

(L to R) Jewell Anne Hartman, Travis Hunter, Zach Citrone, Phil Taylor, 'TK' Taylor Klotz, Andrew Kelley



High Energy Math Club!

Activities of the UCCS Math Club and UCCS S.I.A.M Club were numerous and enthusiastically attended during 2010, in large part due to the efforts of the various club officers (Jewell Anne Hartman, President of Math and SIAM; Andrew Siudzinski, VP of SIAM; Dimitrios Economou, VP of Math; and George Vega, Secretary / Treasurer). Many of the clubs' events were combined activities with the Physics Club. More than 50 students participated in activities, representing Math, Mechanical Engineering, Computer Science, Physics, and Chemistry majors. Activities in which the Math Club participated during 2010 included: construction of a Tesla coil; the Putnam Preparation—Math is Fun meetings; the COMAP MCM contest (see above); attendance at colloquia given by Dr. Kath (see below) and Dr. Grabowski; and fielding (UCCS's first ever) Putnam exam team. This year is only the beginning for the UCCS Math Club, as it continues to grow and new energy continues to spark!

For additional information about Math Club activities, contact Jewell Anne Hartman onions_zero@pcisys.net.

Math Modeling Teams!

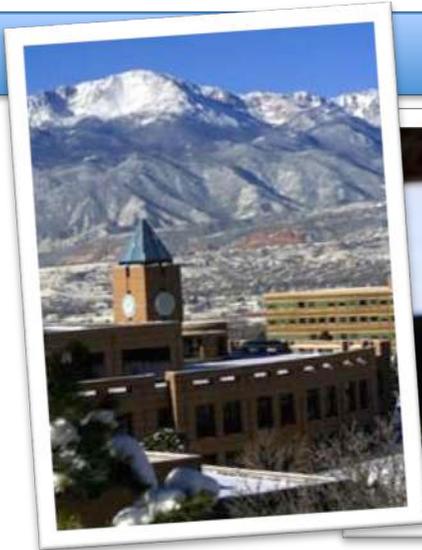
UCCS fielded two teams in the Mathematics Contest in Modeling (sponsored by SIAM) in February. The teams were: (Problem A) Taylor Carlson, Jewell Anne Hartman, Connor Wood; and (Problem B) YongLi Chen, Taylor Klotz, Tim Lewkow. The senior-most team (Chen, Klotz, and Lewkow) made a meritorious (top 20%) achievement in this contest. Greg Morrow was the faculty advisor for the contest. Both groups presented their results at the Front Range SIAM conference in March, held in Denver.

Student Accomplishments

On December 4th six UCCS students competed in the Putnam Exam; this is the first time UCCS has ever fielded a **Putnam Exam Team**.

Travis Hunter won a 2010 NIST-SURF Summer research fellowship in Boulder.

Chris Smith won a prestigious full-tuition UCCS Graduate School 2010/2011 Fellowship, one of only two awarded across the entire UCCS campus.



UCCS Chancellor
Pamela Shockley-Zalabak

Spring 2010 Commencement
Jennifer Holmes & Tim Lewkow

2010 MSc and MS in Mathematics Graduates

Congratulations to the following students for earning either an MSc with Math Emphasis or the Master of Science in Applied Mathematics during 2010!

Spring 2010 Graduates:

- Jennifer Maria Hedden, MSc
- Jennifer Carroll Holmes, MS
- Jared William Jackson, MSc
- McKenna Lynn Roberts, MS
- Lindsey Jo Small, MSc

Fall 2010 Graduates:

- Tracy Alcaraz, MSc
- Jason Grimmett, MSc
- Heather Potter, MSc
- Sandra Shappell, MSc

Lorch Scholarship

The family of former UCCS Professors Bob and Barbara Lorch established the Robert S. and Barbara R. Lorch Department of Mathematics Endowed Scholarship in 2009. 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, went on to earn his Ph.D. in mathematics, and is now a faculty member at Ball State University in Indiana. The funding provides for merit-based scholarships for junior or senior math majors.

In this, the second year of its existence, the math department awarded Lorch Scholarships to **Hannah Wight** and **Andrew Kelley**. Hannah is a third year math major. She is involved in many departmental activities, including holding a position as a teacher's assistant for a section of College Algebra Math 1040. Hannah plans to finish her degree in Fall 2011, and is interested in attending graduate school at one of the University of Colorado branches. "I am very thankful to have been invited to apply for [and subsequently awarded] a Lorch Scholarship for this academic year. I am very grateful to have the privilege of studying at UCCS." Andrew has done math in his spare time (and for his major!) ever since high school. He enjoys, among other subjects, infinite series, groups, rings, and probability. ("Wow! Does math get any better?") Andrew intends to pursue a Ph.D. in mathematics after graduating next May, with intentions of becoming a professor. "Doing math, understanding its essence, and helping others understand: these are some of my biggest passions."

Congratulations to Hannah and Andrew on this recognition. Both Hannah and Andrew join the entire mathematics department in expressing their deep appreciation to the Lorch family for the establishment of this scholarship fund, which will be used to support UCCS mathematics students in perpetuity.

Faculty EmeriTimes

Jim Daly officially retired from the department on June 1, 2010. He is now Professor Emeritus and Research Professor. Jim continues to work on some interesting problems in harmonic analysis, number theory, and image processing; this is collaborative work with S. Fridli (Elte U., Budapest) and J. Benedetto (Norbert Wiener Research Center @ U. Maryland). It goes without saying that Jim continues to hone his golf game, abuse his mountain bike, restore an old BMW, and hike with Oona (his usually-faithful Rhodesian Ridgeback). Plans are afoot for Jim and his wife Mary to take a road a road trip to the Yukon, spend a few weeks in Ireland, and visit the Galapagos Islands.



During June and July, **K.M. Rangaswamy** visited Romania, Hungary and Turkey. In Romania, Ranga thoroughly enjoyed the kind hospitality of departmental colleague Radu Cascaval. Accompanied by Radu's 8 year old (and very smart!) daughter Andrea, Radu took Ranga and his wife Sarah around various places of historical, political, cultural and religious interest. These included: Bucharest (site of the Romanian parliament building, second largest building in the world after the Pentagon, and also the home town of departmental colleague George Rus!); Brasov; Sighisoara (birthplace of King Dracul, the legendary Dracula); the painted monastery at Agapia; and Iasi (Radu's home town). Ranga then visited the Babes-Bolyai University at Cluj, where he gave two talks in the algebra seminar.

Ranga's journey continued with a six hour train ride from Cluj to Budapest, Hungary where he stayed for a week and gave a lecture on his joint work with his mentor Professor Laszlo Fuchs on unions of projective modules at the Hungarian Academy of

Sciences. "This lecture series was started by Professor Fuchs sixty years ago, and it was a special feeling for me to talk about my joint work with him at this seminar." The third leg of the trip began on July 1 in Istanbul, Turkey where Ranga gave a talk at the International algebra Conference held in honor of Professor Jamal Koc. Following this, Ranga gave a course of lectures on Leavitt path algebras at the Bogazaci University. Ranga enthusiastically notes (with good reason!) that "... the whole summer of 2010, I had an enjoyable and academically stimulating time."



Around the Department

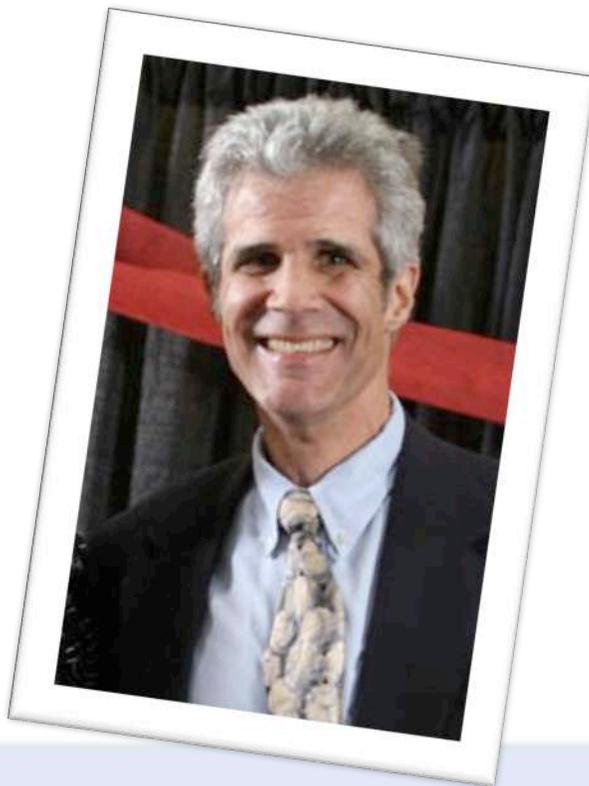
(in alphabetical order...)

Gene Abrams

Gene Abrams continues to do research in the area of Leavitt path algebras. He spent two weeks in July on a research visit to the University of Málaga (Spain). He also spoke at George Mason U. (April) and U. Washington (August). Gene continued his work with the Pikes Peak Math Teachers' Circle Academy and Seminar, as well as with Sky Sox Math Youth Day. Gene received the 2010 UCCS Chancellor's Award in May. This award recognizes teaching, research, and service. (Faculty emeriti Jim Daly and K. M. Rangaswamy are previous departmental recipients of this award.) Gene also presented a talk, titled *The 5000th Lecture*, at the UCCS Convocation in August.

To watch The 5000th Lecture go to:

www.uccs.edu/~provost/convocation/convocationvideo.html



Radu Cascaval

Radu Cascaval's past year was a cornucopia of events, research-wise and other-wise. He attended two international conferences, one at Northwestern U. in January (yes, Chicago can be fun in January after all), and the other one in Iasi, Romania in June (that's right, his hometown, but it felt like the entire world descended upon it for a week or so.) He gave a seminar talk in the Dynamics Seminar at CU Boulder. All of this was related to his continued interest on the control mechanisms in the human physiological system. Along the way he learned a great deal about the mathematics of complex systems. Two of his research papers were accepted for publication in 2010. In an unrelated effort, he joined the University of Colorado President's Teaching and Learning Collaborative with a project on enhancing computational skills within the math curriculum.

(Editor's note: Congrats to Radu on two accounts... In May he was promoted to Associate Professor, and on November 9th he became a US citizen!)

Bob Carlson

Mathematics conferences drew **Bob Carlson** back to the United Kingdom during the summer of 2010. The first meeting occurred on a Friday in Cardiff, Wales. Over the subsequent weekend, most of the participants made their way to Cambridge, England for a week long workshop on the topic of analysis on graphs. The mathematics in Cambridge was quite stimulating. The local environment is a fascinating mix, blending ancient churches and colleges with modern shopping districts and high tech industry. Bob's research continues to draw inspiration from modeling problems in biology. His talk in Cambridge dealt with problems that arise on very complex networks like the human arterial system. He also recently wrote a paper about differential equations modeling fluid or electrical transmission on networks with losses at the network junctions. In a slightly different direction, he has started a collaboration with a couple of mathematical ecologists who are interested in using differential equations on graphs to model population dynamics in rivers and streams.

Jenny Dorrington

Mathematics Learning Center Director **Jenny Dorrington** spent the year building on existing services offered by the MLC. The number of Supplemental Instructors has grown to six, and the MLC has expanded the number of tutors who work with students on an individual basis through Project Success. Many of the students who participate in SI's or Project Success are attempting a class for the second or third time, and with the help of a tutor have been able to pass their math requirement. The MLC has seen the usual high number of students in the Calculus sequence, but has also experienced growing numbers of visitors from classes below Calculus I, Physics, 300 and 400 level math classes, as well as engineering courses.

On a personal note, Jenny got married last May in Estes Park to Jeff Noblett. She had a lot more fun than she thought she would. Jenny thought weddings were usually stressful, but maybe she was listening to the wrong sources! Jenny was really happy to have so many of her family and friends join her, including a few friends from the math department. Jenny's four-month-old granddaughter was also present at the wedding. Congratulations to Jenny and Jeff!

Sarbarish Chakravarty

Sarbarish Chakravarty extensively during summer 2010. He traveled to the "Symmetry Plus Integrability 2010" meeting in early June at South Padre Island, Texas, and gave a talk on Nonlinear differential equations for Triangle groups. This was the First International Conference on Integrable Systems and Nonlinear Waves on the Gulf of Mexico. The place was great, but the weather was hot and VERY humid! Being a member of the Scientific Advisory Committee, his advice to them was "... to hold the second one in December!"

In late June Sarby attended The Second International Conference: Nonlinear Waves--Theory and Applications, at Tsinghua University, Beijing, where he organized a minisymposium on "The KP equation and shallow water waves". The weather in China was also hot, but the food was great! Both of these trips helped Sarby get acclimatized for his next journey, which was to India during the monsoon! He spent 3 weeks in India visiting family and friends during first part of the trip, then went to Kolkata where he was invited to visit the Bose Institute for 10 days. Sarby gave a talk on "Waves in shallow water, the KP line solitons and chord diagrams" at the institute colloquium. Through all his 2010 travels, Sarby notes that "... being able to catch up with a lot of friends (some of whom are scientific colleagues) was the high point."



Shannon Michaux

Around the Department (Continued...)

Beginning in the Spring of 2010, **Shannon Michaux** piloted an experimental College Algebra class that is using an online math system called ALEKS. The goal of this new approach is to try to help students who have mild to moderate mathematical deficiencies to be able to remediate during the course of the semester. It's still too early to decide whether this approach will be successful but it's been interesting to see the differences in student learning with this method. Shannon has also been working on a new placement exam. In the Fall of 2010, most students enrolled in 100 level courses took a version of this placement test that we will use to gather data about which questions are best predictors of success. We hope to have the test ready for incoming students for the Fall of 2011.

This year Shannon Michaux was awarded the The College of Letters Arts and Sciences 2010 Outstanding Part-Time Instructor Award. When asked about this award she said, "When two of my colleagues approached me about nominating me for the award, I was honored. In the weeks leading up to the award several colleagues and students were willing to take time from their schedules to write letters and to help assemble the nomination packet. I was so thankful that people were willing to take time from their other duties to help with my application. Winning the award was wonderful- but after seeing all the work that people put in on my behalf it was just icing on the cake." **(Editor's note: Congratulations, Shannon! Definitely well deserved.)**

Barbara Prinari

Barbara Prinari enjoyed greatly her first year at UCCS. Everything went well, beyond her best expectations. She continued her research work on integrable systems and the inverse scattering transform, and published two articles on this topic during AY 2009/2010, jointly with her collaborators. A third article was recently accepted for publication. In July she received a grant award from the NSF Division of Mathematical Sciences as a P.I. for a collaborative Research at Undergraduate Institutions project on "Dynamics of Soliton Interactions and Applications". Barbara is currently supervising the research work of two undergraduate students, Taylor Klotz and Garrett Dean, on this topic. In the spring she received a CRCW grant award from the UCCS Graduate School for a research project on the "Mathematical Modeling of Quality in a Medical Structure". UCCS math major Henri Ndaya is just starting to get involved in the project. Last fall Barbara was also awarded a mini-grant from the UCCS Faculty Assembly Women's Committee (of which she is a member), for a collaborative research proposal with Federica Vitale, a female graduate student from Italy. Barbara also had the Ph.D. student Anh Bui, from SUNY Buffalo, visiting for a month in Fall 2010, to work with her on the inverse scattering transform for nonlinear Schrodinger systems.

In addition to her other UCCS duties, Barbara helped organize the Second Annual Distinguished Lecture Series talk (see related article below). Barbara was invited to give several talks at conferences and research institutions worldwide. Since joining UCCS in Fall 2009, she gave talks at the UCCS Math Club Colloquia and Math Department Colloquia at Colorado College. She also delivered invited talks at the sixth conference on "Nonlinear Physics, Theory and Experiment" in Gallipoli (Italy), and "Nonlinear Waves 2010" held in Beijing (China), among others. In May 2010 she visited the Department of Mathematical Sciences at Loughborough University, UK.

Greg Morrow

This past year Department chair **Greg Morrow** collaborated with Shannon Michaux, campus administration, and Pikes Peak Community College (PPCC) on various aspects of Math Placement. This includes a new interagency agreement between UCCS and PPCC such that PPCC offers developmental math courses on the UCCS campus through UCCS Extended Studies. Greg has also been working with Shannon on developing an improved Math Placement process to be established through Freshman Orientation. Greg served as the faculty advisor to the two Mathematical Contest in Modeling 2010 teams representing UCCS. The senior-most of these teams (Chen, Klotz, and Lewkow) made a meritorious (top 20%) achievement in this contest!

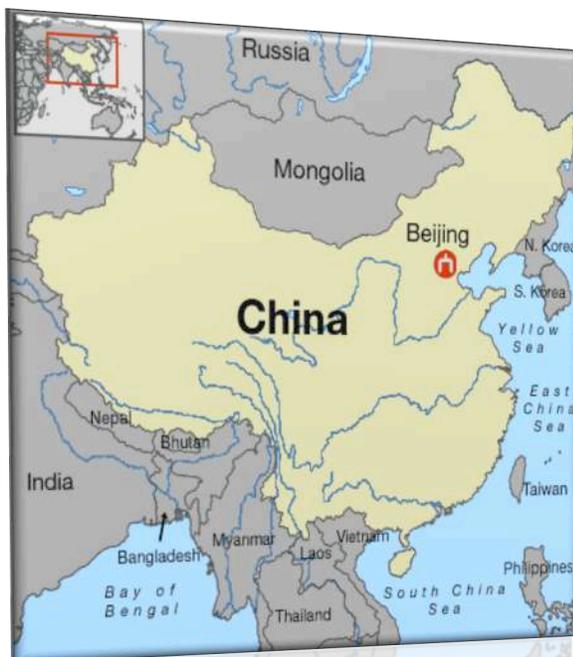
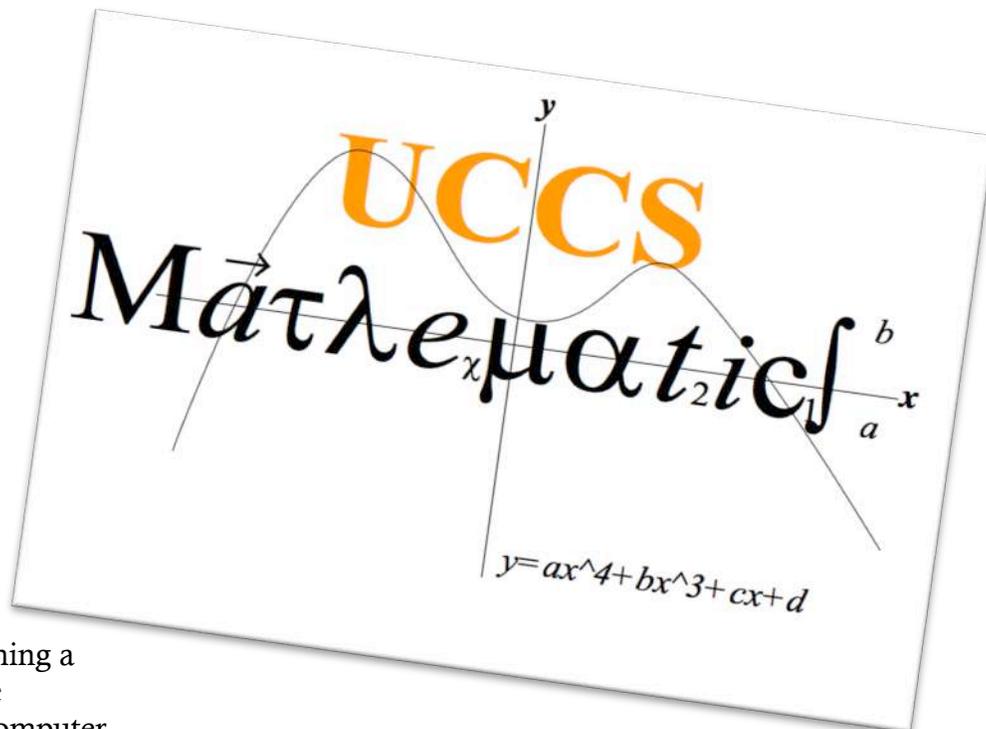
Greg's research on first passage percolation appeared in a volume dedicated to his thesis advisor. Greg is traveling to New Orleans at the turn of year 2011 along with several math dept. faculty to join in scientific activities as well as interviewing activities for the Assistant Professor in math position.

Around the Department

(Continued...)

George Rus

This year **George Rus** began his work with the *MathOnline* program at UCCS, during which he had the opportunity to teach two new exciting courses online: Math 3130 (Linear Algebra) and Math 3400 (Differential Equations). In November he began work with the Extended Studies Program at UCCS, teaching a GRE prep course for the Analytical Part of the Computer Based GRE.



Yu Zhang

Yu Zhang enjoyed teaching a course (Calculus 3) via *MathOnline* last Spring; it was Yu's first online course experience, and he hopes it's not his last. His research program is continues to center around the notion of percolation theory. He had two papers accepted for publication last year. In addition, Yu traveled extensively to share some of his research results and to learn some new ideas in the subject from others: a four week visit to Beijing in the spring (including a talk titled *Conformal invariance and SLE6*), and a one week visit to Japan in September (including a talk titled *Scaling relations for the 2d Ising model*.)

New Faculty Member: Dr. Zachary Mesyan

The UCCS Math Department welcomes its newest member, Dr. Zachary Mesyan. Zak joined the faculty as an Assistant Professor in August. Zak was born in St. Petersburg (then Leningrad) Russia, moved with his family to Armenia when he was four years old, and spent much of his childhood in the Armenian capital city Yerevan. A few months prior to the collapse of the Soviet Union the Mesyan family was (finally) allowed to emigrate, landing in Florida in 1991 in time to celebrate Zak's 12th birthday. ("I like to joke that the U.S.S.R. couldn't survive our departure!")

Zak did well in math classes in high school, but didn't really pursue mathematics seriously until his college days at Brown. He had a wide range of interests as an undergrad, including art history and philosophy, and eventually wound up with a double major in philosophy and mathematics. He was intrigued and motivated by the precision and difficulty of these two somewhat-closely-related fields of study. Zak decided to pursue mathematics at the graduate level, since "... by staying in school I wouldn't have to get real job ...".

During Zak's second year of grad school at UC Berkeley he took a course in noncommutative ring theory from T.Y. Lam; Zak was thereby instantly drawn to the subject, and wound up getting a PhD in algebra in 2006 under the direction of George Bergman. (Editor's note: Lam and Bergman were the Ruth and Gehrig of noncommutative ring theory for many seasons prior to their recent retirements ...) Zak then earned two prestigious two-year postdoctoral positions, first at the University of Southern California, and subsequently at Ben Gurion University (Beersheva, Israel). Dr. Mesyan considers himself to be a 'mathematical problem solver'; indeed, he has already written research papers in a wide range of algebraic topics, including ring extensions and semigroups. (Zak is pictured here during a sponsored research visit to Scotland to work with a group of semigroup theorists at the University of St. Andrews.)

In the classroom, Zak always tries to "... make the material interesting, spicing up things by throwing in some history, a few jokes, some personal anecdotes ...I try to keep the discussion alive and lively." He had no "formal" training as a teacher in graduate school, but was able to pick up and incorporate into his teaching style those methods which he found to be most effective in the classes he took as a student. He is very much enjoying the classroom teaching experience, in part because of the small class sizes, and also in part because he now has the opportunity to teach courses in his mathematical research area.

Zak is also very much enjoying his overall experience in Colorado Springs. "I like the size of the department, and of the campus as a whole ... I've gotten to know not only all of my departmental colleagues, but also a lot of people from other departments and from administration." He appreciates many of the things Colorado has to offer, including the outdoors, the weather, and the cultural opportunities. Zak has been somewhat of a wanderlust throughout his life ("I've lived in four different countries, and have never lived in any one place for more than seven years ..."). However, he thinks that the Brownian Motion phase of his life might now be over, in part because he and his partner Maria will be married soon! Maria is currently an engineering student at a university in Germany; she will move to Colorado Springs when she is finished with her studies.

Please feel free to stop by and say "hi!" and "welcome!" to Zak Mesyan.



Distinguished Lecture Series

During 2009, the Department of Mathematics established a prestigious Annual Distinguished Lecture Series, to be held early in each 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 Second Annual Distinguished Lecture was delivered on October 14 by **Professor William Kath** of Northwestern University. At Northwestern, Bill Kath is a professor in both the Department of Engineering Sciences & Applied Mathematics, and in the Department of Neurobiology & Physiology. His research interests include computational neuroscience, nonlinear optics, linear and nonlinear wave propagation and nonlinear dynamics. His wonderful, interdisciplinary lecture, titled "Computational Modeling of Neurons", was a great success, with nearly 100 people (mostly students) in attendance.



Congratulations to all 2010 Graduates!

Here is the list of the 2010 graduates from each of the department's undergraduate degree programs:

Spring 2010

- Jenna Barnett, Secondary Education
- Leslie Bennett, B.S.
- John Chartier, B.A.
- Yongli Chen, B.A.
- Gaetan Delavignette, B.S.
- Timothy Lewkow, B.S.
- Josef Lechner, B.S.
- Heather Nickler, B.A.
- Taylor Sullivan-Hope, B.S.

Summer/Fall 2010

- Joshua Carnahan* B.S.; *Cum Laude*
- Kelly Hagen, B.A.
- Bryce Herdt, B.A.
- David Hiemer, B.S.
- Norberto Mercado, B.A.