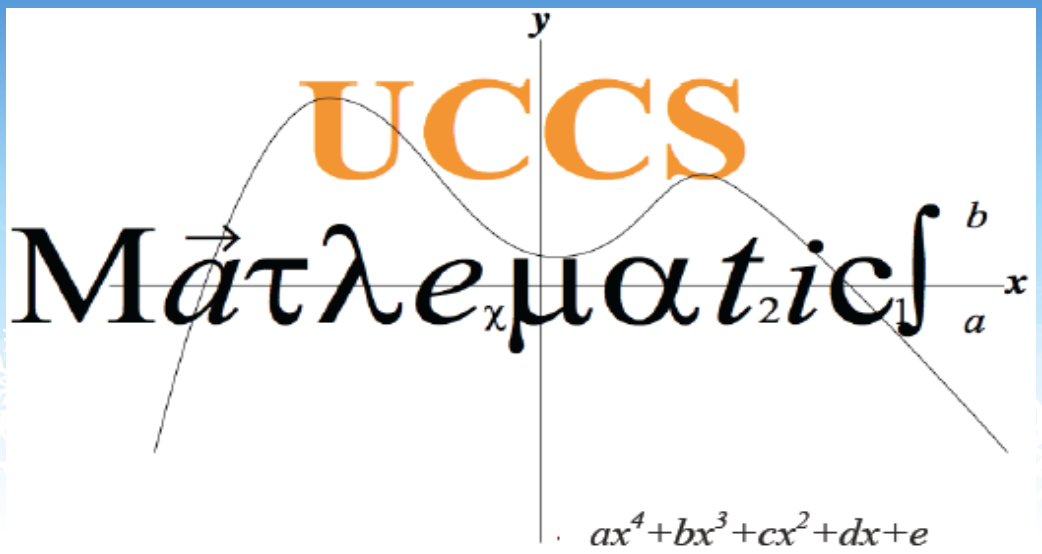
U C C S M A T H D E P A R T M E N T

All the v's that's Fit to Print



2014

Volume 18 Number 1

FALL 2014

In this issue

LAS Outstanding Student Awards

During the "end of year awards ceremony" in May 2014, the following mathematics students were honored for their academic achievements during the Academic Year 2013/2014 by the College of Letters, Arts & Sciences:

Outstanding Undergraduate Students

- Outstanding BA in Mathematics
  -Allan Gardner
- Outstanding BS in Mathematics
  -Jessica Gronski
  -Victoria Slattum
- Lorch Scholarship
  -Allan Gardner
  -Matthew Gonzales

Budapest Semester in Mathematics

Senior UCCS math major **Katrina Eidolon** had the incredible opportunity to live in Budapest, Hungary during Fall 2014, as part of the Budapest Semesters in Mathematics program. "BSM has been one of the best experiences of my life!", Katrina writes. "While here, I've had the chance to delve deep into mathematics in an environment where it is viewed not just as a science, but as an art. I've been afforded the opportunity to study under professors who are world-renowned experts within their fields, in an environment surrounded by other mathematical scholars who are as passionate about mathematics as myself. I've taken interesting mathematics courses in topics that reach far beyond the UCCS catalog, including Combinatorics (the cornerstone of traditional Hungarian mathematics), Advanced Topics in Graph Theory (taught by László Lovász), and Mathematical Problem-Solving (taught by Sándor Dobos, the coach for the Hungarian IMO team). And over the past several months, I've cultivated friendships with some truly amazing peers here in the program, who I hope to keep in touch with for years to come."

Budapest Semesters in Mathematics is ideally situated in Budapest, Hungary, a perfect location not just for studying mathematics, but for residing and exploring within Europe. Katrina has indeed taken advantage of that, having made side trips to Austria, Switzerland, and Italy. Budapest itself is chock-full of history, and the lifestyle is very integrated with Hungary's extremely longstanding cultural traditions. (The cost of living is quite reasonable as well: "rent is about $400, and most meals cost between $3 and $8 when dining out at a nice restaurant.")

"Budapest Semesters in Mathematics is an invaluable program that immerses students in Hungarian mathematics and culture, while providing the opportunity to explore the rest of Europe. My time here has been amazing, and I highly recommend this program to everyone!" More info about BSM can be found at http://wp.budapestsemesters.com/ . Katrina can be contacted at *keidolon@uccs.edu* .

Lorch Scholarship Awarded

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 Department Chairperson and Professor at Ball State University in Indiana. The funding provides for merit-based scholarships for junior or senior math majors.

In this, the sixth year of its existence, the department awarded Lorch scholarships to **Allan Gardner**, and to **Matthew Gonzales**. Matt notes: "The Lorch Scholarship has allowed me to focus on my schooling rather than trying to figure out how to finance my education. I am so appreciative for having received this award and thankful for the Math Department faculty that have taken such an interest in my education." (Matt is planning to pursue a Ph.D. in economics after graduation from UCCS.) Allan notes: "I am pleased to have been chosen for this scholarship; I think it is wonderful that, courtesy of the Lorch family, the math department is able to support its most talented undergraduate students, even in this age of financial fracas. I have made a number of plans for next year, some involving continuing education and some not, but so far the continuing education plans seem to be winning."

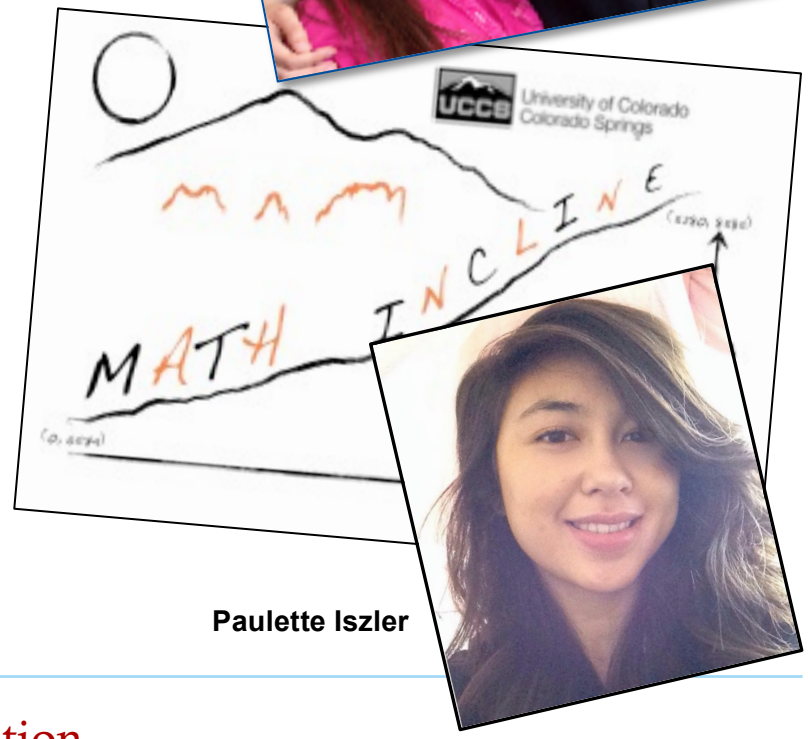
Congratulations, Allan and Matt!

UCCS Math Incline & Putnam Competition

The Math Incline is a problem-solving seminar geared towards UCCS students who are interested in staying "mathematically fit" by attempting to solve challenging problems based on the undergraduate curriculum. The Incline was initiated in 2011. It is sponsored by **Dr. Cascaval**, who helps organize and deliver the Friday sessions. See http://www.uccs.edu/rcascava/mathincline

The Math Incline derives its name from the Manitou Incline, the old Pikes Peak train whose abandoned rail bed now provides an incredibly exhausting venue for runners of all fitness levels. [editor's note: in 2013, running the Manitou Incline was made officially legal, after decades of 'wink-wink' illegality… the Incline was closed for extensive renovations and repairs, and reopened on December 5, 2014.] In part, Math Incline activities serve as a warm-up for the annual Putnam Exam. The Putnam Competition is one of the most prestigious of all mathematics undergraduate competitions; universities throughout the United States and Canada compete in this problem-solving challenge, which takes place annually on the first Saturday of December (i.e., December 6 of this year, just one day after the opening of the Incline. Good omen?).

This year UCCS's Putnam team consisted of three students: **Allan Gardner**, **Katrina Eidolon**, and **Paulette Iszler** Information about the Putnam Exam can be found at http://www.maa.org/awards/putnam. Any reader interested in the Math Incline activities, the Putnam Competition, or other math department undergraduate activities should contact Dr. Cascaval (rcascava@uccs.edu).



Paulette Iszler

COMAP Modeling Competition

In February 2014 undergraduate students **Jessica Gronski**, **Victoria Slattum** and **Matthew Phelps** worked on their paper "Analyzing the Effectiveness of the Keep-Right-Except-to-Pass Rule With Regard to Traffic Flow" for the annual Consortium for Mathematics and its Applications (COMAP) Modeling Competition. The students worked tirelessly for four days (and nights!) to complete this mathematical challenge and submit their paper. Congratulations to these three students for all of their hard work!

Congratulations 2014 Math Graduates!

Here is the list of the graduates from each of the department's degree programs in 2014. An impressive list, to be sure.

Undergraduate Degrees

B.A. Mathematics

- **Alex Betty**
- **Keren Cavanaugh**
- **Makayla Lynn Chriss**

B.S. Mathematics

- **Matthew Cavanaugh**
- **Eric Fruits**
- **Jessica Gronski**
- **Amber Heavner**
- **Kevin McCaw**
- **Victoria Slattum**

Mathematics- Secondary Ed

- **Shaun Rizk**
- **Audrey Szarka**

Graduate Degrees

MSc Mathematics

- **Peter Boateng**
- **Edward Boggess**
- **Tina Lilek**

Ph.D. Program Notes

The College of Letters, Arts, and Sciences houses the degree program Ph.D. in Applied Sciences. The math department offers a mathematics-based Ph.D. as part of this program. The Ph.D. in Applied Sciences, established in 2009, is one of the most recent Ph.D. programs at UCCS. The Math Department admitted its first Ph.D. student in Spring 2011. Currently, the department has four Ph.D. students, representing both U.S. and international students. They are: **Mike Popovic, James Eberle**, **Christin Gunning** and **Kirk Madsen**.

The department has so far identified five core areas in which to offer graduate courses in support of the Ph.D. program, specifically: Real & Functional Analysis; Complex Analysis; Differential Equations & Applied Math; Probability; and Ring Theory. Since 2012, the department has also started offering a small number of Graduate Teaching Fellowships to support Ph.D. students. The current GTF is Mike Popovic.

Math Center Update

The Math Center continues to grow and thrive in its new location (EAS Room 233), **with over 20,000 visitors in 2014**. [ed's note: Wow!] The Center, under the directorship of Dr. **Jenny Dorrington**, added a second statistics tutor last spring to help those students from all over campus who seek help with their capstone and graduate projects. In addition, the Center continues to see increasing numbers of math and computer science students.

The most exciting addition to the Math Center this year has been the new assistant director, **Sean Dean**. Sean has been a Supplemental Instruction Leader for several years, and served as the assistant SI coordinator last year. He started in August as a fulltime staff member, and has been very busy meeting with students, mentoring the SI leaders, and helping Jenny with training and supervising the tutors. Sean has also contributed to the assessment of the center's programs, and will be presenting his research on the efficacy of the Supplemental Instruction program at the national meeting of NASPA (National Association of Student Affairs in Administration in Higher Education) this spring.

This fall, the Math Center cohosted the second annual "**Math Isn't Scary**" Halloween event (in conjunction with the Math Department). Over 100 visitors came through the center in the first 15 minutes of the event (drawn largely by the burritos provided by the department). Many of the visitors stayed (even after the burritos had been eaten) to socialize, and some even stayed to work on math!

Sixth Annual UCCS Department of Mathematics Distinguished Lecture

Jason Bell, a Professor of Pure Mathematics at the University of Waterloo (Ontario, Canada) was invited to present this year's Math Department Distinguished Lecture. Professor Bell is a world-renowned expert in a number of mathematical disciplines, including ring theory, noncommutative geometry, combinatorics, and theoretical computer science. Jason Bell chose to speak about game theory, a discipline in mathematics that studies strategy and decision making in competitive situations. The talk was held the Kraemer Family Library Apse on October 23; nearly 50 people were in attendance.

Game theory is used by economists, political scientists, foreign policy experts, biologists and many other disciplines. Bell provided basic points of the theory, including what it means for a game to be solved. He also touched on topics such as Nash Equilibria and *Prisoner's Dilemma*. Nash Equilibria is an idea that won John Nash the 1994 Nobel Prize in economics. *Prisoner's Dilemma* is a game-theoretic situation in which the prisoners can choose to either cooperate or defect. Computer experiments have shown that when facing numerous different strategies, it is generally the strategies that tend to cooperate that are more successful than the "greedy" strategies that try to take advantage of the niceness of other strategies.

Honors Track in Mathematics

Students with a high Math GPA are encouraged to consider the Honors Track within the BS and BA Math Degrees, preferably in their sophomore or junior year. This track's main purpose is to help identify and encourage qualified students to take on challenges beyond the standard math curriculum. A Math GPA of 3.5 and a general GPA of 3.0 are part of the requirements by the time of graduation. The highlight of the track is a written report on some undergraduate research project, a senior thesis or a senior project in an advanced course, under the supervision of a faculty advisor. Currently, six of our majors are participating in the Honors Track: **Rachel Drawbond, Katrina Eidolon, Eric Fruits, Allan Gardner, Matthew Gonzales and Michelle Osborne.**

For a detailed description and application form, visit http://www.uccs.edu/math/undergraduate-programs/math-honors-track.html

PPRUMC 2014

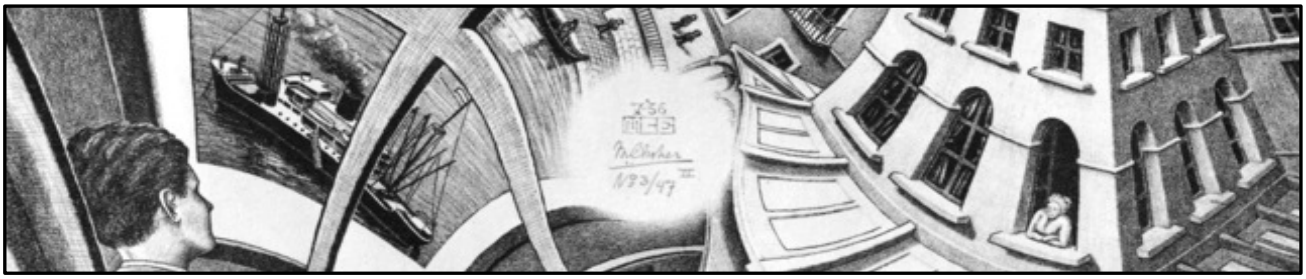
Information about PPURMC can be found at
http://www.uccs.edu/math/pprumc.html
In particular, a link to the video of Professor Erickson's keynote address can be found at that site.

The 11th Pikes Peak Regional Undergraduate Mathematics Conference (PPRUMC) took place at UCCS on February 15, 2014. The conference was preceded by a social event held on Friday February 14. The PPRUMC is an annual conference which is hosted on a rotating basis by four institutions in the Pikes Peak region: UCCS, Colorado College, CSU Pueblo, and the US Air Force Academy. The gathering is sponsored by the national office of the Mathematical Association of America (MAA) (through a grant via the National Science Foundation), and also by the Rocky Mountain Section of the MAA and the UCCS College of Letters Arts and Sciences. The most recent time UCCS hosted the conference was in spring 2009. (In 2013 the conference was at CSU Pueblo, in 2015 it will be hosted by the USAFA).

MAA
MATHEMATICAL ASSOCIATION OF AMERICA

In this year's extremely successful conference, nearly 180 participants from numerous institutions in Colorado and neighboring states attended. These schools included: Arapahoe Community College; Colorado College; Colorado Community College; Colorado Mesa University; Colorado School of Mines; Colorado State University; CU Boulder; Discovery Canyon Campus; Fort Lewis College; Kansas State University; Metro State University (Denver); Pikes Peak Community College; Regis University; UC Denver; UCCS; University of Northern Colorado; University of Wyoming; USAFA; and CSU Pueblo.

The conference schedule included: 23 student talks, organized in two (morning) or three (afternoon) parallel sessions; a very popular keynote talk by **Stefan Erickson** of Colorado College ("Cryptography in the computer age: how to use number theory to take over the world"); and a panel discussion ("Beyond an undergraduate Mathematics degree"). Participants also attended a screening of the documentary "Achieving the unachievable" by J L Bergeron. This movie describes a mathematical inquiry about the mystery behind the missing hole in MC Escher's "Print Gallery". Participants seemed to quite enjoy this event.



Our New Faculty Member

The department is pleased to welcome **Dr. Meredith Casey**. Dr. Casey joined our faculty this Fall as a Full Time Instructor. The Newsletter staff had a chance to chat with Meredith about life in general, and mathematics in particular.

Newsletter: **Tell us a little bit about yourself.**

Meredith Casey: I was born and raised in Savannah, Georgia; much of my family still lives there. We did a lot of outdoor activities while I was growing up, especially fishing (specifically, shrimping and crabbing). We'd come back with a dozen or so crabs after a day on the beach, and would have quite the feast for the whole family!

v's: **When and how did you develop an interest in mathematics?**

MC: Although my dad didn't do math for a living (he was a small businessman who started / owned some television and electronics stores in Savannah), he totally loved math, and shared some of his passion with me and my sister. For instance, sometimes, rather than reading to us at night, we'd instead practice reciting the powers of 2. I caught the math bug that way (although my sister definitely did not!) Then I remember vividly in my 8th grade science class we watched a video about physics, and the things that physicists do. That absolutely sealed the deal, I knew right then that I wanted to be a scientist so that I could research and discover new things.

v's: **So your interest in math came later?**

MC: Right, it wasn't until I was in my first year at the University of Georgia that I found out that you could actually do research and discover new things *in math!* We had a really close-knit group of majors who started the same year I did, it was fun and challenging to learn all these new ideas together. Looking back, I guess I was the only woman in that group, but I don't ever remember that being anything remarkable. I had this great opportunity to attend an REU [ed's note: Research Experience for Undergraduates] after my junior year, it was on the mathematics of string theory.

v's: … **and then graduate school?**

MC: I knew pretty early on that I was definitely interested in pursuing a Ph.D. There was a professor at the University of Pennsylvania (John Etnyre) whose work in the area of contact topology was totally intriguing to me. I wanted to work in that field, and perhaps even with him directly. As it turned out, he wound up taking a faculty position at Georgia Tech [ed's note: Atlanta], which is only about an hour away from where I had been an undergrad at UGa. So that made my choice of graduate schools pretty easy.

***v*'s: Sounds like Georgia exerts a pretty powerful gravitational pull on you …**

MC: Maybe so. But it turns out that my time at Tech definitely afforded me some great opportunities not only to get out of the state, but to actually get out of the hemisphere! In fact, in one eighteen month period during my time as a graduate student, mathematics (and physics) projects took me to Vietnam [2 weeks], and to France [3 weeks], and to Germany [5 weeks]. Mathematics is definitely a universal subject.

***v*'s: Can you tell us a little bit about the subject area of your thesis work?**

MC: My research area is contact topology, specifically, branched covers of contact manifolds. The idea is to develop theorems that explain how branched covers of contact 3-manifolds behave, but in the course of my investigation of this idea I realized that there actually were gaps in the understanding of branched covers of plain (non-contact) three manifolds. So some of my thesis includes theorems I proved about branched covers over surfaces and three-manifolds as well.

***v*'s: How are you enjoying your experience teaching at UCCS?**

MC: The students here are really good! I especially like working with engineering students, they seem to have a "results-oriented" mindset that is well-suited to many of the problems and ideas in calculus. [ed's note: Meredith gets so many students to come to her office hours that she's had to move from her office to the student lounge in order to accommodate everyone!] I've also gotten involved in some outside-the-classroom activities, including the Veterans Education Training and Support program, helping to design the new math computer classroom, and various other curricular projects.

***v*'s: Anything else you'd like to share with us?**

MC: My husband Shaughn is in the military; when we found out last winter that he would be stationed in Colorado Springs for a few years starting in mid-2014, we were pretty anxious about my finding a university teaching position close by. But the planets were aligned just right, and the UCCS position is a really nice fit for us. And all this was happening within months of the birth of our daughter Samantha in October 2013!

Please join us in welcoming Dr. Meredith Casey to the UCCS Math Department family.

Around the Department

(In RANDOMLY CHOSEN order)

Yu Zhang

Yu Zhang continued his research work in percolation theory, specifically on the *incipient infinite cluster*. The incipient cluster has been used in the physics literature in an attempt to describe infinite cluster at the critical temperature. It has been shown that the fractal number for the incipient infinite cluster is 91/48. Together with Professors Higuchi and Takei, Yu published a paper this year in which a similar estimate for the Ising model was obtained.

James Parmenter

James Parmenter is still enjoying teaching classes at UCCS, mostly of the calculus variety, although he occasionally does teach a linear algebra class. He and his wife recently bought and moved into a house in the Old North End Neighborhood of Colorado Springs; they are loving their new home, and being close to everything that is downtown. “Aside from dining out and enjoying time with good friends we've had the opportunity to travel back to California a few times and visit our family, including our adorable 10 month old nephew.”

George Rus

George Rus had a busy, yet fulfilling year. George continued teaching one of our challenging capstone courses, Mathematical Modeling (Math 4480/5480). He took extra time and attention to improve the student experience, which was noticed by his students. For the first time in ten years, George took the summer off from teaching. He and his family took the opportunity to visit family and friends in Romania and Italy. The vacation was filled with great memories and was especially memorable for his 3 year old daughter, Zara. In the Fall, George partnered with Dr. **Jenny Dorrington** and developed a new course for the Gateway Program Seminar, entitled "Numbers." The course served incoming freshmen and focused on the history, philosophy, and applications of numbers. Even though George taught this course as an overload, he found the experience satisfying and exciting.

Kulumani Rangaswamy

Professor Emeritus **Kulumani Rangaswamy** "… had, on the whole, an extremely productive and satisfying year". A brief account of Ranga's activities during 2014 include: a short trip to India in January; a presentation at the Southern Regional Algebra Conference at Auburn University (Alabama) in March; delivering a Colloquium talk at New Mexico State University in April; delivering a conference talk at Ohio State University in May; presenting a research talk at the International Algebra Conference at Spineto Italy in June; and giving an invited plenary talk in honor of the 90th birthday of Professor Laszlo Fuchs at Tulane University in September. [ed’s note: Whew!] As part of the celebration honoring Professor Fuchs' birthday, Ranga was also invited by the research journal Periodica Mathematica Hungarica to write (jointly with Bruce Olberding) an account of the contributions of Professor Fuchs to commutative ring theory. As if all of this travel and speaking wasn't enough for a Retired (er, Emeritus) Professor, a number of Ranga's research papers got published during 2014 as well.

Barbara Prinari

Barbara Prinari's year was both full, and fulfilling. In January, Barbara was invited to make a presentation at the first ever UCCS STEM Scholarship Showcase. [ed's note: Science, Technology, Engineering, and Mathematics] "This was essentially a 10 minute sales pitch to incoming students on why becoming a math major is a good idea." Barbara was the director/organizer of the 11th Pikes Peak Regional Undergraduate Mathematics Conference, which was hosted by UCCS in February. [Read a more complete story of the PPRUMC elsewhere in the Newsletter.] Additionally, Barbara: organized a June conference on nonlinear waves in Sicily; co-organized the first 'Colorado Nonlinear Day' at UCCS, a one-day conference with over 40 scholars from throughout Colorado, held on November 1; and was one of the organizing committee co-chairs of the biannual SIAM conference on Nonlinear Waves and Coherent Structures, held in August. [ed's note: maybe "Prinari" translates from Italian to English as "Organizer"?]

On the publication side, Barbara co-authored 5 papers (3 published, 1 to appear, 1 submitted), and co-edited a volume of Proceedings of the American Mathematical Society for a conference session she co-organized last year. She delivered a number of invited talks, both at universities (including U. Ioannina, Greece) and at conferences. On the pedagogy front, Barbara successfully completed the UCCS Summer 2014 Teaching Online Certificate Program.

Greg Morrow

Greg Morrow stepped down from his role as chair of the UCCS Department of Mathematics on August 1. Greg had served in that role for six years. [ed's note: THANKS Greg!] In February, Professor Morrow gave a UCCS Math Colloquium on his work on the distribution of runs in the gambler's ruin problem. He subsequently extended this work, and presented a paper on his findings in May at the Frontier Probability Days 2014 Conference in Tucson. " It was nice to see the desert there, and to meet up with old colleagues", some of whom he hadn't seen since 2007, when the inaugural Frontier Probability Days Conference was held at the UCCS campus. During Fall, Morrow taught Real Analysis I for his first time. He learned many things, and enjoyed unfolding the theory with his students, with a fresh perspective born of being away from the subject for so many years.

Greg Oman

Assistant Professor **Greg Oman** had an extremely productive year, with four articles accepted in refereed journals, as well as four contributions to the "Problems" sections of various undergraduate-oriented publications. He gave two research talks: one at the Ohio State U / Ohio U Ring Theory Seminar in Columbus, and another at the New Mexico State Algebra Seminar. Greg received a UCCS Faculty-Student Research Award (joint with undergraduate Tori Slattum, who is now a grad student in Applied Math at CU Boulder), and advised Tori on her project for graduation with honors. (Tori was also our "Outstanding B.S. in Mathematics" award-winner). Greg is currently serving as advisor for Luke Harmon on an M.S. Thesis.

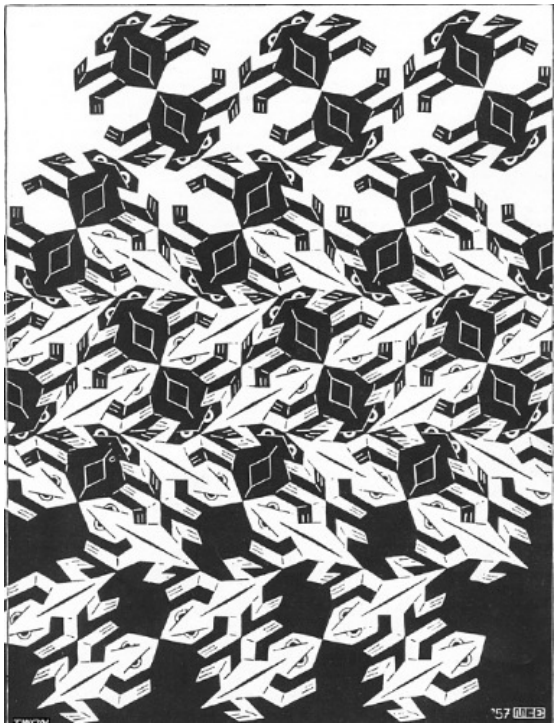
You may have on occasion seen a sweat-soaked Greg entering the back of the EAS Building. "I started walking from Four Diamonds Parking Lot up to my office, to get my old body some exercise, and of course to save a few dollars on parking."

[Editor's Q/A: Question: Which UCCS Math Faculty member is considering the possibility of getting a pet pig? Answer: Obvious]

Shannon Michaux

Shannon Michaux spent much of 2014 in the classroom. She continues to enjoy the classes she teaches because she enjoys watching the students' understanding of the concepts of math increase. During the year, she also continued to work with the CU Succeed program which is a partnership with area high schools that helps high school students to earn college credits for math courses taken at their schools. She also enjoyed reaching out to students not on our campus through a pair of *MathOnline* courses.

During the summer semester, Shannon had the chance to expand her knowledge of online teaching by completing the Teaching Online Certificate program sponsored by the Faculty Resource Center. In this course, participants had the chance to learn about some of the best practices in online teaching and how to design a course to make it student friendly. Shannon hopes to use some of the information she learned in this course to expand her online course offerings.



Zak Mesyan

During 2014 **Zak Mesyan** hosted two research visitors: James Mitchell (University of St Andrews, in Scotland) and Jonathan Brown (University of Dayton, in Ohio). James Mitchell's visit lasted about three weeks and produced a paper on topological semigroups. Another paper, on infinite-dimensional linear algebra, resulted from a new collaboration with Miodrag Iovanov (University of Iowa) and Manuel Reyes (Bowdoin College).

Zak and his wife Maria continued exploring Colorado throughout 2014 by visiting the Rocky Mountain National Park in September, just in time to observe elk during their mating season. The two of them have also gone on multiple flights in two- and four-seat airplanes, piloted by Gonzalo Aranda Pino. [ed's note: Gonzalo is both a licensed pilot *and* a mathematician (from the University of Málaga, Spain) who is a frequent visitor to the UCCS math department.] "Gonzalo has been enthusiastically sharing his love of flying with us."

Jenny Dorrington

Jenny Dorrington continued her directorship of the Math Center [see related article above]. In November, Jenny and two of the Math Center tutors taught a workshop on mathematics and art to a group of middle school girls. The workshop was part of the Girls in STEM Experience day hosted by the UCCS Center for STEM Education office. The three instructors introduced their group to the mathematical notions of *symmetry* and *tiling*, and taught the students one of the methods used by Escher to create tilings of the plane. "The girls had fun, and learned that math can be beautiful as well as useful."

In addition to her work with the Center, Jenny continues to be busy with teaching. Over the summer she was very happy to supervise two graduate students in an Algebraic Topology course. So happy, in fact, that she met the students via Skype from Iceland one week!

Sarbarish Chakravarty

Sarbarish Chakravarty continues to do research work on nonlinear waves and completely integrable systems. His recent work has focused on the initial value problems of the KP equation which describes shallow water wave patterns found on flat ocean beaches. He received a 3-year NSF grant on this topic in June. In July, he visited Waseda University in Tokyo and gave an invited talk on the line-soliton solutions of the KP equation. He also gave a colloquium talk in at the Colorado School of Mines in September. In November 2014, he organized (jointly with **Radu Cascaval** and **Barbara Prinari**) the ``Colorado Nonlinear Day'' meeting at UCCS. (http://www.uccs.edu/math/math-events/colorado-nonlinear-day.html)

In addition, Sarby continues to serve as chair of the graduate committee of the math department.

Radu Cascaval

Radu Cascaval had an extremely busy 2014. Among some of the highlights of his year, Radu completed two research papers on the optimization and control in networks. He made two research presentations: one in Madrid, Spain (at a conference on Differential Equations, attended by 2500+ mathematicians working in this field alone, “quite a unique experience!”), and the other at Cambridge University in England (at the SIAM conference on Nonlinear Waves and Coherent Structures). Radu secured a UCCS *BioFrontiers* grant to continue research on cardiovascular mathematics. This grant provides substantial funding to a graduate student and an undergraduate. Radu also participated in a multidisciplinary grant funded by the Missile Defense Agency. On the pedagogy side, Dr. Cascaval designed during Spring 2014 a brand new course at UCCS: Scientific Computation - MATH 3670. (Radu even paid a visit to MIT to chat with world-renowned author Dr. Gilbert Strang about this course.) He then taught the course during Fall 2014 (“I never had so much fun teaching a course before!”).

In addition, Radu developed a database of MATLAB GUIs for illustrating computational tools used in undergraduate math curriculum. In 2014 Radu became the Director of the UCCS *MathOnline* program, and helped expand it with two additional courses (MATH 3410 - Intro to Analysis and Math 3810 - Intro to Prob and Stats). Radu continued to be the leader and content coordinator of the UCCS *Math Incline* seminar during Fall 2014 [ed’s note: see related article], and helped revive the Math Club at UCCS. And all of this while continuing to act as the Undergraduate Chair, and coordinating the effort to refresh our undergraduate degrees, and developing the Math Kangaroo program [see below]. (He wonders what more exciting things await him in 2015!)

Peter Braza

In addition to many other college-wide accomplishments, Dean of the College of Letters, Arts and Sciences **Peter Braza** is particularly pleased that the campus has agreed to allow the math department to outfit one of the campus classrooms (Osborne B213) to be used as a computer lab. Peter noted: "At long last, the department will have a dedicated computer lab for our students. Now our students will get better exposed to mathematical and scientific computing, which in turn will help them in their future careers in industry, or in government … or in mathematics!"

Bob Carlson

Bob Carlson took over as Mathematics Department chair on August 1, 2014, taking the departmental reins after Greg Morrow's six year stint. Bob had been chair for two years a decade ago, so in theory he knows what he's getting into. "The chair's job seems more hectic than I remember: more meetings and more problems, especially those related to enrollment growth and class scheduling." One outcome of the scheduling difficulties is that the Mathematics Department got approval from the administration to hire a new tenure track assistant professor, to begin Fall 2015. [ed's note: Nice!] This is always an exciting activity. Just before starting his new administrative job, Bob went to a huge Dynamical Systems conference in Madrid, Spain. Some 2,500 specialists were in attendance. Bob presented a paper on infinite graph models for population dynamics. Bob also made a research presentation at Colorado Nonlinear Days, and made a follow-up similar ("more relaxed") presentation of this same work in the UCCS Math Department Colloquium in November.

Gene Abrams

Gene Abrams earned some serious frequent flier miles in 2014, giving lectures on his current research interest (Leavitt path algebras) at numerous places throughout the world, aimed at three different types of audiences. Gene's article (joint work with Gonzalo Aranda Pino) about Leavitt path algebras for Cayley graphs was accepted for publication. [ed's note: Gene also earned some not-so-frequent flier miles by spending a morning in April flying around the Pikes Peak region in a two-seater aircraft with Gonzalo as pilot.] The material in that article leads naturally to a connection with the Fibonacci sequence. So Gene put together an accessible-to-undergrads (and hopefully entertaining-to-faculty) talk about that work, and delivered a version of it during 2014 at UCCS, Colorado College, St. Peter's University (New Jersey), Pacific Lutheran University (Tacoma), and Seattle University. In addition, Gene gave department-wide research colloquia at the University of Washington and at Rutgers University; he also presented more-focused algebra seminars at the University of Washington, the University of Málaga, and Syracuse University. Last (but definitely not least) Gene had the opportunity (along with Ranga) to attend a conference and give a talk in Spineto, Italy. The two organizers of that conference (Francesca Mantese and Alberto Tonolo) plan to visit Colorado Springs in May, 2015. Gene notes, "while Colorado wine is not exactly up to Italian standards, Colorado microbeer is head and shoulders above any birra italiana." Speaking of beer, one of Gene's personal highlights in 2014 was visiting (for the first time in his life) the Baseball Hall of Fame and Museum in Cooperstown, NY, while he was in upstate New York for his lecture at Syracuse. Speaking of baseball, Gene continued his ongoing work with the Colorado Springs Sky Sox Baseball Math Youth Days. A highlight this year was being interviewed on-air in the radio booth during one of the MYD games.

Math Kangaroo comes to UCCS

Math Kangaroo is an annual international competition for grades 1-12, attended by over 7 million students worldwide (http://www.math-ksf.org). It is a 75 minute challenge held on the third Thursday of March. The problems are geared towards logical reasoning, critical thinking and are in the form of fun puzzles and spatial riddles. UCCS hosted for the first time a MK center, open to the community. At UCCS 73 students took part in 2014. The US participation is increasing exponentially (http://mathkangaroo.org), with still very small numbers from Colorado. Each child can benefit from being exposed to this kind of problem solving - unfortunately schools have not embraced this approach which has proved to be very successful in other countries, where the MK is part of the school work. The next Math Kangaroo event is scheduled for Thursday, March 19, 2015 at UCCS.

Oman's Offerings

(Here are the Problems, written by Greg Oman, which appeared in various national refereed publications during this past year)

American Mathematical Monthly 121 (2014), no. 1, p. 83. **Problem #11750.**

Prove or disprove: For every integral domain D and every nonzero element d of D, there exist infinitely many irreducible polynomials p in the ring D[x] (the ring of polynomials in one variable with coefficients in D) such that p(0) = d. (Recall: a nonzero, nonunit element f of D[x] is irreducible if g or h is a unit of D[x] whenever gh = f.)