UCCS

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$$ax^4+bx^3+cx^2+dx+e$$

University of Colorado at Colorado Springs

2011
NEWSLETTER

IN THIS ISSUE

Outstanding Student Awards

During "end of year awards ceremonies" in May 2011, the following mathematics students were honored for academic achievements during Academic Year 2010/2011 by the College of Letters, Arts, and Sciences:

Allen Boartfield and **Garret Dean** were named the Outstanding Undergraduate Students in the Mathematics Bachelor of Science program. **Andrew Kelley** was named the Outstanding Undergraduate Student in the Mathematics Bachelor of Arts program. **Richard Neely** was named the Outstanding Mathematics Graduate Student. Congratulations to all four award winners for jobs very well done!!

Lorch Endowed 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 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 third year of its existence, the math department awarded the Lorch Scholarship to **Tommy McDowell**. Tommy is currently a senior in applied math with emphasis on economics, scheduled to graduate in Spring 2012. He has worked as a tutor in the Math Learning Center and given multiple talks about research work with Dr. Chakravarty on the KP-2 Equation. Tommy has plans to pursue graduate work in Econometrics.

Tommy was thrilled to receive this award. "Dr. Carlson was a few months late for Christmas when he told me about the Lorch Scholarship, but I'll forgive him and the rest of scholarship committee because of how thankful I was to receive it. Thank you again. Math is the simplest form of truth; I think that is why I enjoy it so much."

Congratulations to Tommy McDowell on this achievement. Tommy joins 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.

Undergraduate News

Our Undergraduates were busy this year doing research with faculty members, going to conferences and getting involved in various competitions.

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New Department Member!

Dr. Greg Oman joined the Math Department in Fall of 2011 as an Assistant Professor. Check out the profile of Greg further down in the Newsletter!

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CONGRATULATIONS
2011 Graduates!

Here is the list of the graduates from each of the department's degree programs in 2011. An impressive list, to be sure!

Undergraduate Degrees

B.A. Mathematics

Andrew Kelley
Lonney Vogt
Chris Boe
Holly Crowhart
Jewellanne Hartman
Joshua Kerstetter
Roberto Padilla
Bernard Redlinger
Hanbyul Yoon

B.S. Mathematics

Nathaniel Brown
Garrett Dean
Sara Goldman
Jordan McClung

Mathematics- Secondary Education

Kelsy Kroeschen
Christopher Cockerham

Graduate Degrees

M.S. Applied Mathematics
Gregory Hatten
Alyssa Ortiz

M.S.C. Math Emphasis
Michael Madsen
Stacey McMillen

★ ★ ★

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*Dr. Omer Angel,
University of British Columbia*

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 Third Annual Distinguished Lecture was delivered on September 27th by **Professor Omer Angel** of the University of British Columbia, Vancouver, Canada. Professor Angel's research interests are in the general area of probability theory, and specifically include percolation, random graphs, random walks, particle processes, and scaling limits.

Professor Angel's talk, titled "Random Planar Maps", was visually stunning (great graph graphics!) and quite informative. In addition, Professor Angel demonstrated his skill as a juggler, by juggling as many balls as there were questions asked during his talk. What a novel way to encourage audience participation! The talk was enjoyed and appreciated by the dozens in attendance.

Undergraduate News

Invaluable Service …
Our honorarium instructors!

   The department is extremely fortunate to have number of dedicated, effective instructors who help us meet the mathematical needs of UCCS students. We thank them for their time, effort, and enthusiastic teaching! You can find photos and contact information for all of our honorarium instructors at:

http://www.uccs.edu/~math/lecturers.html

Dennis Duncan

Tim Eiles

Heather Heath

Christine Irons

Dr. Bill Kiele

Thelma Latimer

Richard Neely

James Parmenter (GTF)

Mike Popovic (GTF)

Virginia Ramos

Ben Schoonmaker (GTF)

Wendy Spratte

Michael Steinman (GTF)

Les Tekamp

*Note: GTF denotes "Graduate Teaching Fellow"

Undergraduate Research

There was a wealth of research done by our undergraduates this year.   For instance**, Dr. Prinar**i had two students (**Taylor Klotz** and **Garrett Dean**) working on a project in the study and visualization of two-component dark soliton interactions for the vector nonlinear Schrodinger equation. (Garrett has since graduate and started work in a prestigious PhD program at North Carolina State U. in nuclear physics this past Fall). **Tommy McDowell** worked with **Dr. Chakravarty** on a project involving the KP-2 Equation.

Garrett Dean spoke at the Colorado Springs Undergraduate Research Forum, held at the USAFA, in April. In addition, a number of students attended the Rocky Mountain MAA meeting in Boulder in April.

COMAP Modeling Competition

   In February, a UCCS team consisting of **Allen Boartfield**, **Taylor Klotz**, and **Tommy McDowell** participated in the annual COMAP Math Contest in Modeling (MCM/ICM) (http://comap.com).   Greg Morrow served as the faculty advisor.
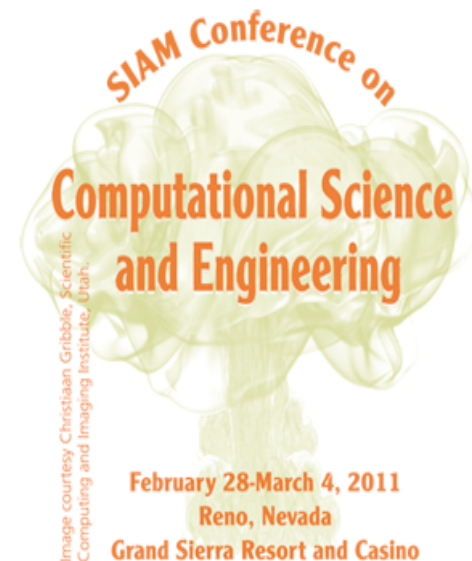
SIAM News

 In March, UCCS was represented at the 2011 SIAM Conference on Computational Science and Engineering Student Day, in Reno, Nevada, by **Jewell-Anne Hartman**.

   Also in March, a sizable contingent of students and faculty went to the SIAM (Society for Industrial and Applied Mathematics) Front Range Applied Math (FRAM) meeting in Denver. **Tommy McDowell** and **Taylor Klotz** each gave a presentation at that meeting.
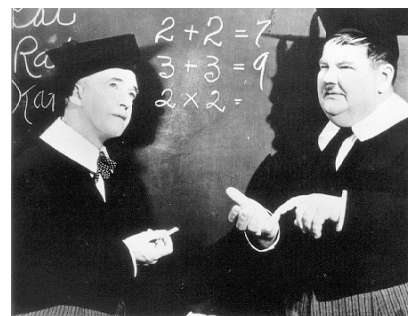
2011 William Lowell Putnam Competition

The UCCS math department fielded its second consecutive William Lowell Putnam Mathematical Competition team, this year consisting of **Phil Taylor, Taylor Klotz, and Jonathan Thompson**. The competition was held on Dec. 3, and **Dr. Cascaval** served as faculty advisor. The plan is to continue encouraging students to train for, and participate in, future Putnam competitions. During Spring 2012 the Math Department will hold weekly meetings where topics and problems similar to those given in the Putnam Exam will be discussed.

SIAM Conference on
Computational Science and Engineering

Image courtesy Christiaan Gribble, Scientific Computing and Imaging Institute, Utah

**February 28-March 4, 2011
Reno, Nevada
Grand Sierra Resort and Casino**

Ph.D. in Applied Science with emphasis in Math

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.

FOR MORE INFORMATION

Please contact the Graduate Committee Chair:

Dr. Sarbarish Chakravarty
1420 Austin Bluffs Parkway
Colorado Springs, CO 80918

(719) 255-3549
 schakrav@uccs.edu

BY MAIL:

Graduate Liason UCCS Dept of Mathematics
1420 Austin Bluffs Parkway
Colorado Springs, CO 80918

Greg Oman

The UCCS Department of Mathematics is happy to welcome **Greg Oman** into the fold. Greg was hired as an Assistant Professor of Mathematics, and began his duties here in August 2011. We had a chance to sit down with Greg and ask him about some of the things that led him to mathematics in general, and to UCCS in particular.

Greg was born and raised in Sunbury, Ohio, a small town 20 miles north of Columbus. With the massive Ohio State University essentially in his backyard (more than 60,000 students!), Greg succumbed to OSU's intense gravitational field upon high school graduation ... and stayed at OSU for fifteen years. (Really! Five-ish years as an undergrad, six-ish years as a grad student, and then a few more years as a full time lecturer.)

Greg's original plan was to major in Spanish, but switched to math during his freshman year. One reason for the switch: he got hooked on solving math problems / puzzles, including the quasi-famous "Lockers Problem". While he enjoyed the math classes at OSU, he found himself becoming immersed in various math textbooks without even being enrolled in the corresponding course. (Indeed, he took a year off from his undergraduate courses to simply learn some math on his own, including abstract algebra, the subject that would eventually become his research specialty.) In addition to his studies, Greg was also a member of OSU's track and field team, and as such can claim to be a teammate (asynchronously, of

course) of the legendary Jesse Owens. Greg was a high-jumper; his personal best of 6 feet, 8 inches is four inches above his own height.

Greg recalls being unimpressed by his undergraduate professors at OSU, a fact which he claims has helped his own teaching style in the classroom. ("Whatever they did, I try to do the opposite.") Greg has many years of university-level teaching experience under his belt, and has developed an effective teaching / learning style over that time. In addition to making sure that he provides plenty of examples of problems in class, he also makes a habit of pointing out to students some of the common mistakes that some of his students in previous classes have committed, with the goal of preventing similar mistakes in the future. In questionnaires completed by students in previously-taught courses, Greg is quite satisfied when he sees comments of the flavor " ... he was really committed to helping us understand the material ..." We're guessing that UCCS students will provide similar feedback.

Greg's research field is algebra (broadly defined). He is somewhat of a mathematical Bohemian, having done work in logic, semigroups, groups, and rings. He is very interested in, and has a long history of, research collaborations with students, including and especially undergraduates. He has posted a number of problems over the years in various publications, including *College Mathematics Journal* and the *American Mathematical Monthly*. Here's an example, taken from a recent *Monthly* issue: *Let R be an infinite commutative ring with identity. Suppose that every proper ideal of R has smaller cardinality than R. Prove that R is a field.* (Math 4140 students should take a whack at

that one!) Greg does much of his mathematical thinking in the wee hours of the morning; this night-owl timetable makes his 10:50am classes a bit of a challenge... His advice for math majors is this: "Mathematics is incredibly interesting and fascinating. But to appreciate it to its fullest, make sure that you have a really solid understanding of the foundational stuff, specifically the idea of what it means to *prove* something. So of course you should work hard in all your courses, but work especially hard in courses like the Discrete Math course (Math 2150), where you are exposed to the foundations of mathematical thinking."

Outside of the university, Greg enjoys working out, and hiking. Those pursuits are especially well-suited to Colorado Springs, with its overabundance of sun, mountains, and scenery. Greg has enjoyed his first few months here in Colorado. The biggest difference between UCCS and his previous institutions (Ohio State and Ohio U) is the absence here of a "college town environment", specifically, the absence of an actual town directly adjacent to the campus. Who knows, maybe by the time Greg retires from UCCS (2050? 2060?), there might actually be a pizza joint and bowling alley at the corner of Meadow Lane and Austin Bluffs Parkway!
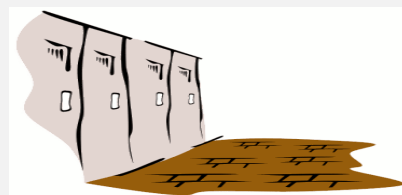
Greg is often in his office (typically late afternoons and evenings), feel free to stop by and say hi to our newest department member.

FAMOUS "LOCKER PROBLEM"

Can you solve this problem? Check it out at:

http://www.mathteacherscircle.org/resources/sessionmaterials.html

"Lockers: An Open and Shut Case"

Greg's locker (Office) is in ENG 281 and his phone number is (719) 255-3515

AROUND THE DEPARTMENT
IN ALPHABETICAL ORDER…

Gene Abrams

Gene continues to do research in the area of Leavitt path algebras. He spent two weeks in September on a research visit to the University of Málaga (Spain). He gave lectures on this subject at half a dozen universities throughout the US, including a talk to the algebraists at his undergraduate alma mater, UC San Diego. (He had not given a presentation there in more than 35 years!) Gene also continued his work with the Pikes Peak Math Teachers' Circle Academy and Seminar, as well as with Sky Sox Math Youth Day. In work with coauthor Jessica Sklar of Pacific Lutheran University (Tacoma, WA), Gene received the 2011 Allendoerfer Award from the Mathematical Association of America. This award recognizes expository articles written for the MAA's *Mathematics Magazine*. The article, titled "The Graph Menagerie: Abstract Algebra and the Mad Veterinarian," describes how so-called Mad Vet Puzzles (a recreational math activity suitable for all ages) are intimately related with Leavitt path algebras!   A link to the article is at www.uccs.edu/gabrams.
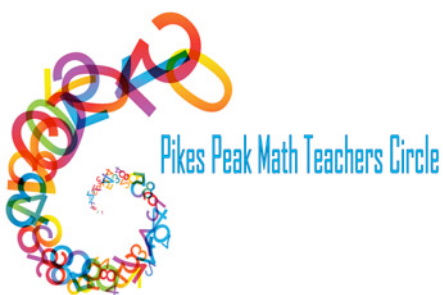
Bob Carlson

Bob joined several thousand applied mathematicians at the International Congress of Industrial and Applied Mathematics, which was held during the summer in Vancouver, BC. He gave a lecture there about some interactions between Fourier Analysis and Graph Theory. During the lunch break he enjoyed the spectacular British Columbia scenery.

Bob's research continues to draw inspiration from modeling problems in biology. This year he completed two papers concerning differential equations and related difference equations on complex networks resembling the human arterial system.   His recent collaboration with mathematical ecologists has been heating up as well. There is a long-established research area that studies the minimal spatial domain sizes that will support a healthy population. If you set up a park or nature preserve that is too small, interactions with the hostile outside environment can lead to the demise of the populations you are trying to preserve. Bob and his collaborators are trying to extend this theory to include the network structure you see in river and stream ecosystems. A paper is taking shape as this newsletter goes to press.

Radu Cascaval

In 2011 **Radu Cascaval** continued his research on the analysis and control of nonlinear PDEs on networks, and gave research presentations during the Joint Annual Meetings in New Orleans, during an international conference on Analytical and Numerical Methods for Multiscale Systems in Heidelberg, Germany, and also during an international conference on Evolution Equations and Operator Semigroups in Bari, Italy. These are three *foreign* countries (!), with fascinating customs and distinctive cuisines, countries which Radu has visited previously. (The Big Easy was his place of US birth sixteen years ago, a place dramatically changed by Katrina, and yes, it does feel like a foreign country, judging by the food and music alone.) Through his 2011 travels, he strengthened his conviction that seafood tastes better near the sea. The Mediterranean sea, that is. He also found an elegant proof of a three-year old conjecture about why his Italian colleague in the UCCS Math Department is such an amazing chef.

On the domestic front, he relaunched the Introduction to Computational Math course in the Fall, and continued a study on the effectiveness of the introduction of computational skills in the Math curriculum. He coordinated the creation of a Calculus for Life Sciences course, with its first projected offering at UCCS to be in Fall 2012. That was done with his new hat as undergrad chair in the department, a whole experience in itself!

Sarbarish Chakravarty

Sarby Continued his research on integrable systems. He received an NSF grant in July for collaborative research in KP line solitons. Sarby attended a conference on Nonlinear Waves held at Athens, GA in April. In July he hosted a short term visitor (Kenichi Maruno, U Texas.) at UCCS.

Jenny Dorrington

Math Center Director **Jenny Dorrington** was very busy during 2011. The Math Center is exploding, both with new programs and in student usage. For instance, during the past year the Center instituted new tutoring offerings for students, supporting such courses as computer science and statistics. The MLC is now offering peer mentoring, dedicated one-on-one tutoring, and online tutoring. Jenny has also been busy with the task force on general education, a subcommittee of the strategic planning committee, and the LAS admissions committee. On a personal note, Jenny and her husband Jeff (a geology professor at CC) spent two weeks in Scotland in June. One week, spent on the Isle of Skye, was mostly taken up with the great outdoors (Jeff loved the rocks, Jenny was enamored by all the sheep) with one indoor visit to the Talisker whiskey distillery. They also spent a few days in Edinburgh with more indoorish pursuits (castles, cathedrals, and the cemetery where Colin MacLaurin is buried).
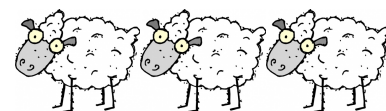
Zak Mesyan

Second-year department member **Zak Mesyan** was quite busy during 2011. On the research side, Zak wrote a paper with UCCS colleague Gene Abrams, as well as one with James Mitchell, Michal Morayne, and Yann Peresse. The latter paper was completed as the result of two research visits: the first while James and Yann visited UCCS in the spring, the second while Zak visited the three coauthors at the University of St Andrews in Scotland in June. Zak also gave a talk at a conference on groups and model theory in Germany in May.

On a more personal note, Zak got married in January, while on vacation in Miami. He and his wife Maria then went on a celebratory road trip throughout Europe during the summer. They visited wineries in Germany, stopped at a few places in France, spent a while in Spain, and had dinner in Geneva. "Exploring Gaudi's buildings in Barcelona, and driving at 130mph on the German autobahn, were among the highlights of the trip." Between visits to Europe, Zak also fulfilled two of his life-long ambitions: to see both Ozzy Osbourne and Judas Priest in concert. (Editor's note: Judas Priest!)

Shannon Michaux

The (well-deserved) recognition just keeps on coming for **Shannon Michaux**! In the Spring of 2011, Shannon received the UCCS Campus' Outstanding Instructor award. Since teaching is the part of her job that she most enjoys, Shannon said it was nice to be recognized in this way. (Shannon was also honored last year with a similar award from the College of Letters, Arts, and Sciences.)

Shannon spent much of the year working on the implementation of a new math placement test. The goal of the new test is to help students begin their coursework at an appropriate level. By having students start courses at the right level, the department hopes to help students achieve much more success in their math classes! To date, over one thousand students have already taken the test. Over-the-top invaluable help in the student registration process was provided by Bev Kratzer (of the UCCS Student Success Center), as well as by Emanuelita Martinez and Joshua Goldman (the gurus of our Math Department Office).

Greg Morrow

Greg Morrow began a second term as Math department chair. Greg traveled to the AMS Annual meeting in New Orleans in January, both to attend talks and to interview candidates for the math assistant professor position (the position eventually filled by Greg Oman). Morrow also traveled to Oaxaca, Mexico, to participate in an international conference on Stochastic Processes and Its Applications (SPA). Oaxaca has a diverse plant life, and its floral richness is perhaps best symbolized by the Arbol del Tule, a towering 1500 year old Montezuma Cypress. Stemming from this SPA conference, Morrow hosted the 2011 Distinguished Math Lecture speaker, Professor Omer Angel of the University of British Columbia (see the precious article). Morrow received LAS College funding to participate in an international conference held in Denver entitled Worldwork 2011. At that conference, Morrow continued his ongoing education in leadership processes on topics concerning conflict resolution, diversity, gender roles, and social interaction. Greg Morrow supported Shannon Michaux and several other colleagues, including placement test bank architect **Bill Kiele**, in bringing Math Placement online to all first-time freshmen math students.

Greg Oman

Newly hired department member **Gregory Oman** arrived at UCCS in August. Read more about Greg on page 5.

Barbara Prinari

In 2011 **Barbara Prinari** published three papers. Two of these were on integrable systems and inverse scattering (one was written with two UCCS undergraduate students, Taylor Klotz and Garrett Dean, and a graduate student from Univ of Salento, Federica Vitale). The third paper focused on the mathematical modeling of quality in a medical structure. In addition, Barbara had a number of research collaborators coming to UCCS for short stays, from institutions both in the United States and in Italy.   Barbara gave invited talks on her research work at the ICIAM conference in Vancouver, Canada, as well as at SC2011 "International Conference of Scientific Computing" in Cagliari, Italy.

Barbara was extremely busy not only speaking about her research work, but organizing conferences in her research field as well. She was invited by the American Institute of Mathematics (AIM) to spend a week at their headquarters in Palo Alto, CA, as a co-organizer of a SQuaRE project. She also organized special sessions at the Joint American Mathematical Society meetings in New Orleans, LA, in January; at the 7th IMACS conference in Athens, GA, in April; and at the joint international congress of the American and South African Mathematical Societies in Port Elizabeth, South Africa, in November.

Kulumani Rangaswamy

During September-October 2010, emeritus professor **Kulumani Rangaswamy** visited the University of Glagow, Scotland to work with Professor Patrick Smith. The two of them completed a research project on generalized artinian and noetherian rings. Visiting the home/museum of the famous Scottish poet Robert Burns near Glasgow, and enjoying a "wee dram of whisky" while reading some of Burns' well-known poems which were inscribed on the wall there (and which Ranga had studied many years ago as part of his own undergraduate English Literature course), was a special experience.

During June and July Ranga visited Germany.   After acting as a tourist and spending some time at the enchanting Rhine river and Mosel river valleys, he participated at the International Conference on Groups and Model Theory arranged by the University of Essen. There he gave a talk on his aforementioned joint work with Patrick Smith.

"Some of my efforts to learn the new (to me) topic of the theory of Leavitt path algebras during the last few years resulted writing a few papers on this topic," some of which are coauthored with UCCS colleague Gene Abrams, others of which are joint with mathematicians from throughout the world. A number of these papers were accepted for publication during the last year.

George Rus

2011 was a very eventful year for **George Rus**, both academically and personally. Academically, George continued his work with the Extended Studies Program at UCCS, teaching a GRE prep course as well as courses through *MathOnline*. Also, during the year, he taught two new courses, Math 5330/6330 – Real Analysis I, and Math 3810 - Introduction to Probability and Statistics. This brings his total up to 10 different courses taught at UCCS in a two and a half year span.

On a personal note, the year started with the best and most exciting news. On December 31, 2010, George became a father! His daughter, Zara Alexandra Aurelia Rus was born at 2:50 am, weighing 4lbs and 15oz and measuring 44cm. She is a very happy and healthy child, smiling and laughing with everyone she meets. During the summer, George and his wife Gina purchased their first home and welcomed their families for Zara's baptism.

Yu Zhang

Yu was on sabbatical during Spring semester. During that time he visited Prof Wu at Beijing Capital Normal University for a month, to do work to work on the unique infinite oriented cluster. Yu also visited Professor Chow at Sinica University in Taiwan for a month, to work on questions involving random matrices.

We're on the Web!
Find us at:
http://www.uccs.edu/~math