"All the ν's that's fit to print"
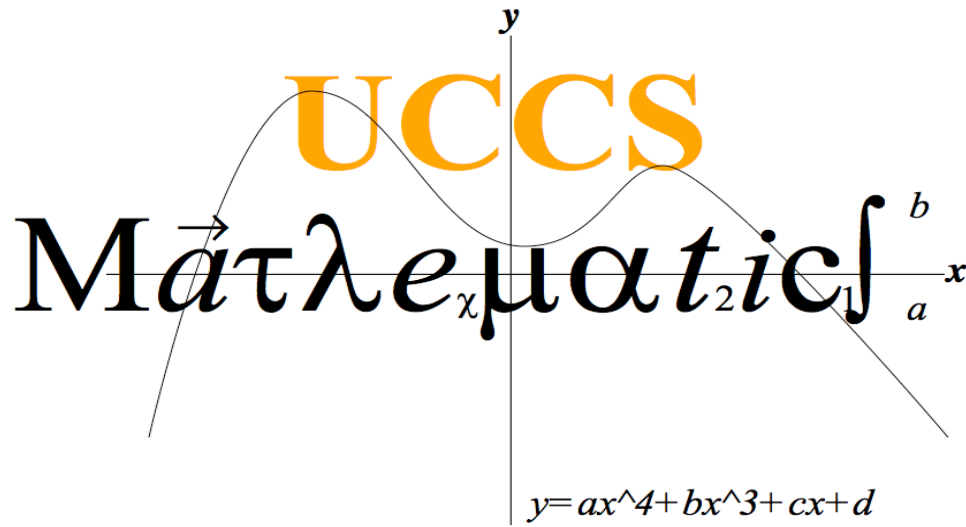
UCCS
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$$y = ax^4 + bx^3 + cx + d$$

Department of Mathematics
Newsletter

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Outstanding Student Awards

During "end of year awards ceremonies" in May 2006, these three mathematics students were honored for academic achievements during Academic Year 2005/2006.

Nathanael Hansen was named the Outstanding Student earning a B.A. in Mathematics.

Lan Thuc Le was named the Outstanding Student earning a B.S. in Mathematics.

David Bervig was named the Outstanding Graduate Student in Applied Mathematics.

Congratulations to Nathanael, Lan, and David for jobs very well done !!

Around the Department
(… in alphabetical order …)

Gene Abrams was on sabbatical assignment during Spring 2006. He attended conferences and gave various colloquium talks throughout the U.S., at places including U. Washington, U. Iowa, U. Nebraska, U.C. San Diego, and U. Connecticut. Gene then spent the months of May, June, and July on a sponsored research fellowship at the Universidad de Málaga, Spain. There he did research with Professors Mercedes Siles and Gonzalo Aranda Pino. He also made visits to Spanish universities in Barcelona, Cádiz, and Murcia. The topic of Gene's current research is Leavitt path algebras, a subject developed in Fall 2004 jointly with Gonzalo Aranda Pino. Gonzalo re-visited UCCS for the months August and September, having also spent Fall 2004 at UCCS.

Gene also made three presentations at the "Café Scientifique", one each in Denver, Colorado Springs, and Boulder. The Café is a way for people involved in scientific endeavors to share their work with the general public in an informal setting (a local pub!). The series is held monthly in Colorado Springs at the Phantom Canyon Brewery. (For more info about the Café, contact David Anderson danderso@uccs.edu .)

Bob Carlson saw two of his books appear in print during 2006. His junior/senior level text on real analysis, entitled *A Concrete Introduction to Real Analysis*, was published by Chapman & Hall/CRC. This text provides a gentle but thorough introduction to the theory of calculus and related material that is required for all undergraduate mathematics majors. Bob is also coeditor of the book *Quantum Graphs and Their Applications*, published by the American Mathematical Society. This book contains the proceedings of a summer research conference held in 2005. The subject matter, a mixture of differential equations and graph theory, has seen a burst of research activity over the past few years. Bob is currently engaged in a research project in this field with collaborators in the Ukraine. He is also looking forward to an April 2007 trip to Cambridge, England, where he will participate in a related workshop.

During 2006 **Radu Cascaval** traveled to Missouri and Tennessee where he gave research talks during the Dynamical Systems Weekend at University of Missouri – Columbia, and during the Applied Analysis seminar at The University of Memphis. He helped organize the second SIAM Front Range Student Research Conference, held at CU Denver in March. Locally, he advised two teams of UCCS students during the annual Mathematical Modeling Competition organized by COMAP. He also coordinated the project of videotaping and archiving Math courses on the Web, now available: http://www.uccs.edu/math/video/. Yet, by far his best achievement was welcoming his new son, Stefan, on August 31st, 2006!

Sarbarish Chakravarty was on sabbatical assignment during Spring 2006. He visited Ohio State, SUNY Buffalo, and CU Boulder, giving various colloquium talks and doing research with collaborators along the way. Sarby had three research visitors come to UCCS: Rod Halburd of Loughborough Univ., U.K. (Dec. 2005), Yuji Kodama of Ohio State (March 2006), and Robert Maier of University of Arizona (Aug. 2006). Sarby is working on certain connections between integrable systems and modular forms, and recently co-authored a paper on this subject with number theorist Heekyoung Hahn from Rochester University. Mark Ablowitz from CU Boulder was the other co-author on this paper. As it turns out, Heekyoung and our own number theorist Seung Son share the same Ph.D. advisor, Professor Bruce Berndt of the University of Illinois.

Jim Daly continued his research collaboration with Professor Sandor Fridli of Elte University, Budapest, Hungary. Jim and Sandor had the paper "Multipliers for Multiple Walsh Series" accepted for publication and are working on revisions. In the final stages of editing is the paper "A Precise Marcinkiewicz Multiplier Theorem for the Dyadic Hardy Space". Jim attended the inaugural conference at the Norbert Wiener Center for Applied Harmonic Analysis at the University of Maryland, as well as the wavelet conference at the University of Colorado in Boulder in honor of the retirement of Larry Baggett. In addition to his research work, Jim was grant coordinator on an $800,000 grant from the Colorado Department of Education for the training of middle school math and science teachers (his duties ended in July of this year). Jim is also the co-principal investigator on a $150,000 National Science Foundation proposal for creating a new course on quantitative reasoning.

Using a grant she obtained from the Colorado Commission on Higher Education, **Shannon Michaux** was able to offer a section of Math 104 College Algebra for students in the UCCS Pre-Collegiate program. The Pre-Collegiate Program identifies minority middle- and high-school students in the Colorado Springs and Pueblo areas who are potentially first-generation college students. The Program subsidizes university coursework for these students to take before their entry into the university. All the lectures for this course were done strictly online, and have been added to the Math Department's website for the use of students who are trying to brush up on their algebra skills.

Greg Morrow traveled to Paris in July for a conference on Stochastic Processes and their Applications. Greg lamented that "... there were many memorable events, but there was also extreme heat, *sans AC*." Greg helped organize the Front Range Probability Day in Boulder during May. Following this, he co-wrote a grant proposal to extend this event to a two-day Probability Workshop for next year. Greg taught Functional Analysis (Math 535) in Spring with video archiving. Several graduate students from far away lands tuned into the lectures--apparently this material had not been previously offered at other institutions with similar free access to lectures. Greg continues to co-organize the UCCS math colloquium. He also served this past Spring in the role of Associate Chair of the Math department. Last, but definitely not least, Greg was promoted to full professor this year. "It was worth the wait (27 years after the Ph.D.)!" Congratulations to Greg on this achievement.

Keith Phillips is currently in his second year of his three year phased retirement. This means that he has teaching duties only during fall semesters. Keith

spent much of Spring 2006 working on a manuscript describing the topic of wavelets. This work was in conjunction with math department Ph.D. student Joyce Treulieb.

K.M. Rangaswamy, like Keith Phillips, is also currently in his second year of his three year phased retirement. Ranga spent Spring semester 2006 visiting Baylor University in Texas and University of Wuerzburg in Germany. He also took time to do some high altitude trekking in Tibet, and took a plane ride around Mount Everest!

Department chair **Rinaldo Schinazi** visited UCLA in June and attended the Stochastic Processes and Applications conference in Paris in July. There he met a classmate from *high school* who is a researcher in a closely related field of probability! Rinaldo's research on mathematical biology was supported by a summer grant from the National Security Agency. In addition, he finished the first draft of a textbook in mathematical analysis; he used this book when he taught Math 341 in Spring 2006, and he is currently it using to teach Math 431 this fall.

Seung Son spent a great deal of time and energy accommodating the math department's move to the LAS college (see related story below). Much work had to be done related to technology, including such things as: e-mail forwarding, account creation, spam filtering, testing new machines and software, cooperating with the campus IT people, and taking care of many unexpected needs and requirements. "Because of hidden contributions of unsung heroes such as Radu (Cascaval), Nick (Bufmack), Karen (Greis), and Joanie (Stephens), we did not feel much interruption of our daily usage of e-mail, web, PCs, equipment, and devices" during the move, Seung said. Seung believes that the technology piece of the move to LAS has been quite successful, even with various hurdles and constraints.

The Committee on Research and Creative Works granted Seung appropriate funds for the purchase of a 64-bit machine and software that he can use for efficient algorithm development for large number handling. Seung's research area is in analytic number theory, and his ability to use computers to recognize patterns in numbers is quite useful.

In addition, Seung is now the advisor for the Math Club. In this role he attends the Friday meetings, gives talks, helps plan activities, interacts with the advisors at other universities, and attend conferences. The club created a website which it uses to communicate information to club members (and potential members!) electronically. Check it out at http://www.uccs.edu/~math/mathclub/ .

Math Club News
by **Sanghui Lee**
President of the UCCS Math Club

Join us for fun, food and math! Yes, you heard right. The words "fun" and "math" were used in the same sentence. Our goal is to expose students to diverse topics of pure and applied math. First of all, this semester we have a new faculty advisor – Dr Seung Son. We also had some changes in our officer positions. Robyn McIvor is our new Vice President. Replacing her is Miguel Lezcano as the new treasurer. Devin Hall is our new Secretary, and Karen Greis is our new Publicist. This year we had two teams competing in the Math Modeling Competition sponsored by SIAM (Society for Industrial and Applied Mathematics). We again had a SIAM conference where the two teams talked about their solutions to the competition problems. It was a great success! We also participated in the Sky Sox Math Youth Days and Engineering Challenge day, events designed to promote math to middle school students. Also, Ginger Anderson, a graduate student, gave a talk on "Surreal Numbers", explaining the field containing the real numbers as well as the infinite and infinitesimal numbers. Dr Rinaldo Schinazi highlighted some of his research topics in a talk about the birth and death chains of viruses depending on effectiveness of treatments. Caryn Knutsen mediated a discussion on the possible careers mathematicians can pursue and different qualities that can make a graduating student more marketable, as well as discussing the pathway for graduate school. Dr Seung Son gave a talk about Ramanujan, one of India's greatest mathematical geniuses, emphasizing some of his work with a few of Ramanujan's mysterious hypotheses. All in all, we have had another eventful year, and I hope next year will be even better!

Congratulations to All 2005/2006 Graduates!

Here is the list of the Academic Year 2005/2006 graduates from each of the department's degree programs. An impressive list, to be sure!

B. A. Mathematics:
Donna Ashlock

Susannah Burton
Joshua Chadwick
Kristin Duffy
Nathanael Hansen   (with Honors)
Michael Inman
Olivia Loh
Rachel Montoya
Julia Smith
Jaque Stone   (with Honors)
Nashonna Windsor

B.S. Mathematics:
Rebecca Gressler
Nicholas Hubbell   (with Honors)
Caryn Knutsen
Lan Thuc Le   (with Honors)
Daniel Newman
Kirsten Pyhtila

M.S. Mathematics
Gordon Neal
Ricardo Delgado

M.S. Applied Mathematics:
Kristopher Marcus
Ginger Anderson
Kevin Grimm
David Bervig

Congratulations to all the AY 2005/2006 graduates from the Department of Mathematics!

Math Department returns to the College of Letters, Arts, and Sciences

As of Fall semester 2006, the UCCS Department of Mathematics is now officially a part of the College of Letters, Arts, and Sciences (LAS).

The department was housed in LAS when the UCCS campus was formed in 1965. However, in the late 1970s the department was moved to the College of Engineering and Applied Sciences. So the current move represents a "return" of the department to its roots.

A note went out from Tom Christensen, Dean of the College of Letters, Arts, and Sciences, to all current math majors. In the letter, Dean Christensen described some of the changes that math majors might see in their curriculum due to the switch of colleges. (editor's note to students: If you have questions about these changes, or if you are a math major who did not receive this letter, please contact the math department immediately.) He also wrote: "The emphasis in mathematics is traditionally more directed at fundamental science and at support of …

K-12 educational programs. This emphasis is more in line with the directions of the science departments in the College of Letters, Arts and Sciences. Mathematics Departments are far more typically housed with Science departments than with Engineering Departments."

The UCCS math department has in the past worked hard to effectively meet the needs of constituent departments in ALL of the departments in ALL of the colleges across the campus. We will certainly continue that work in our new home in the College of Letters, Arts, and Sciences!

Department Focus
Jim Henderson

In this issue of the UCCS Department of Mathematics Newsletter we spotlight Dr. James Henderson. Dr. Henderson is the UCCS Vice Chancellor of Student Success, and member of the UCCS Department of Mathematics.

Jim and his family have lived in the Pikes Peak Region since 1985. Jim came to Colorado Springs as a faculty member in the department of mathematics at Colorado College. He began his vice chancellor position at UCCS in January of 2003. His interest in UCCS grew out of a (prestigious!) yearlong A.C.E. Fellowship during AY 1998/99, in which Jim got an 'up close and personal' view of the inner workings of various aspects of UCCS administration.

Jim's mathematical training is in the field of geometric topology. He earned B.A. and M.S. degrees in mathematics from the University of Texas, and a Ph.D. in 1979 from the University of Wisconsin. Jim considers himself to be a very "visual learner", and geometric topology allows him to play to this strength. Geometric topology is intimately related to the previously-famous-to-mathematicians, now-famous-worldwide *Poincare Conjecture*, the mathematical problem which was recently solved by the Russian mathematician Grigory Perelman. (editor's note: For an intriguing story about Poincare and Perelman from the *New*

Yorker magazine, see

Jim is absolutely certain that his training as a mathematician has suited him well for his position in Student Success. Having taught mathematics for many years, Jim came to understand firsthand a number of lessons about students and student learning. Of course, one such lesson is that different students have different learning styles! In addition, Jim came to understand how important it is to have positive faculty / student interaction, both in and out of the formal classroom setting. He learned about how to keep students engaged, even when they might otherwise be discouraged.   "Students respond when they are confident, so I spend a lot of time with students making sure they not only have the tools to succeed, but the confidence to succeed as well." In fact, one of the first things Jim did when he moved into his Main Hall office was to have a whiteboard installed. That way he can still help students who might have a problem from a math class!

In the final part of our interview, Jim looked back on the road that led him to an administrative position in student success. "I never expected when I was earning my Ph.D. in mathematics that I'd eventually wind up in such a role. But learning mathematics, and then teaching mathematics, was both great motivation and great training for the job!"

New logo, new shirts !!

The new UCCS Math Department shirts are here! They cost $15. The front has a "mathematically interesting" design incorporating the words UCCS Mathematics; on the back it says "Don't drink and derive, or you will not be able to differentiate when you have reached your limit". Comes in White, Black, and, yes, even PINK! Contact the math department at `mathinfo@uccs.edu` .