

“All the v’s that’s fit to print”



Newsletter

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Outstanding Student Awards

During "end of year awards ceremonies" in May 2000, four mathematics students were honored for academic achievement during Academic Year 1999/2000.

Daniela Williams was named the Outstanding Student in the Bachelor of Arts in Mathematics Program.

John Steiger was named the Outstanding Student in the Bachelor of Science in Applied Mathematics Program.

Bongsun Kim was named the Outstanding Student in the Master of Science in Applied Mathematics Program.

Patricia Scriffiny was named the Outstanding Student in the Master of Basic Science, Mathematics Emphasis Program.

Congratulations to Dani, John, Bongsun, and Patti for jobs well done !!

Recognition of Faculty and Staff

At the aforementioned awards ceremonies three mathematics department members were recognized for outstanding contributions to the department, college, and university.

Joanie Stephens was named the EAS College Staff Member of the Year.

Ken Rebman was named the EAS College Teacher of the Year.

K.M. Rangaswamy ('Ranga') was recognized (along with Dean Ron Sega and Tina Moore) for his extensive work with various diversity-related initiatives and activities as the EAS College

received the CU President's Diversity Award for 1999/2000.

Around the Department

We are pleased to announce a new addition to the department family: **Shannon Michaux** (with help from husband Brian) gave birth to **Emma Rae Michaux** on September 21, 2000. Statistical data: 7 pounds 13 ounces, 20 3/4 inches. Before long Emma will be running in Monument Valley Park with her mom! ...

Keith Phillips spent the summer learning about and teaching seminars on how finite fields (such as Z_2) can be used in computer search engines. (Yet another message that 'abstract' algebra can actually be 'applied' algebra!)

Ranga was a scientific organizer of the International Conference on Abelian Groups and Modules, held in Perth, Australia during Summer 2000. In addition to giving a presentation at this meeting, he is also one of the editors of the conference proceedings. Also, Ranga was honored to be named as an editor of the journal *Communications in Algebra*. This is a five year, renewable appointment.

Sarbarish Chakravarty earned a grant from the Australian Research Council, totaling over \$200,000. The title of this grant is Multilevel Soliton OTDM-DWDM Ultra-high Bandwidth Transmission System Duration. The grant lasts through 2002. In addition, Sarby earned an EAS College Grigsby grant, and travel grants to present papers in Japan and Australia.

Greg Morrow was on sabbatical during Spring 2000. During that time he started on a new research project with Sarby on Statistical Analysis of Optical Transmission Systems. The collaboration continues ... Greg is also coordinating the retention efforts in the department. This involves making sure students in our 100-level courses have access to the help and services they need to succeed in their mathematical studies. (There are over a thousand students in these courses!)

Rinaldo Schinazi was busy earning frequent flier miles! He gave talks on his research in probability theory in Marseille and Toulouse (France) over the summer. He spoke on his research in mathematical biology in Toronto in September, and will speak in Frankfurt in the near future. In addition, Rinaldo has been nominated to serve on a National Science Foundation committee which analyzes postdoctoral fellowships.

Bob Carlson attended the Mathematical Challenges of the 21st Century conference at UCLA in August. This conference was a major international gathering, part of World Math Year 2000. There were many invited speakers who presented talks about the hot problems for the next millennium. Some of the topics were: Navier-Stokes equations (a million dollar prize is being offered for anyone who can prove classical existence and uniqueness results about them), other nonlinear PDEs arising in geometry, theory of quantum computers, computational problems in molecular biology and genetics, etc. Bob also got to tour the new NSF sponsored Math research center on the UCLA campus.

Congratulations to All 1999/2000 Graduates!

Here is the list of the Academic Year 1999/2000 graduates from each of the department's degree programs. An impressive list, to be sure!

B. A. Mathematics:

John Reilly
Daniela Williams
Dale Burk
Leanne Doughty
Jennifer Cotter
Nichole Agrusa

Joy Morris
Angela Mound

B. S. Applied Mathematics:

John Steiger
Devin Stinger
Kareth Bellew
Michael Griffin
Clint Hoskins
Tyler Lievrouw
Lana Long
Sheila Noriega

M. S. Applied Mathematics:

Bongsun Kim

M. B. S. Mathematics Emphasis:

Patricia Scriffiny
Karen Smith

Notes From the Squeaky Chair Jeremy Haefner

Chair, Department of Mathematics

The Academic Year 2000/2001 promises to be an exciting and productive one! Here are some new and different features of the department ...

To begin, there have been a number of personnel changes. For the first time in its history, the department has an Associate Chair. This important position is being filled by Rinaldo Schinazi. Rinaldo's duties include student interaction and course scheduling. Ken Rebman has officially become a full-time member of the department, relinquishing his half-time role in the VCAA office. (Of course we will feel free to call on Ken's vast administrative experience during department meetings!). In addition to teaching and other coordinating activities, Ken will oversee the department's web site. As of January 2000 the Math Learning Center has a new director, Dr. Shannon Schumann. An interview with Shannon appears at the end of the Newsletter. Yu Zhang is on leave this year in the department of statistics at the Wharton School of the University of Pennsylvania; this is a very prestigious (though temporary) appointment at an Ivy League institution.

There are a number of important programmatic changes in our undergraduate and graduate degrees, including the implementation of a senior capstone course, a 'tracks' program at

the graduate level, and the consolidation of our two Bachelor degrees into a single program. These changes are spelled out in more detail later in the Newsletter. The department also continues to support a number of efforts designed to improve student success, including the COAMP program.

The MathOnline program continues to grow. During Spring 2001 we will teach five 'traditional' math courses using a unique system which allows the instructor's voice and boardwork to be transmitted real-time via the internet. The lectures are also archived for student review. In Fall 2001 we plan to teach all seven 'core' math courses using this system: Calculus 1,2,3, Discrete Math, Statistics, Linear Algebra, and Differential Equations. For more info about this program visit mathweb.uccs.edu/mathonline.

The department has been involved in a number of interactive programs with area K-12 schools over the past year, and plan to continue these programs in future years. For instance, the MathOnline program allows high school students who have completed calculus prior to their senior year to enroll in sophomore and junior level courses at the university without having to travel to the UCCS campus. As another example, this year we have piloted the CU - Succeed Precalculus program. This program, modeled on a similar program offered through CU - Denver, allows students who enroll in qualified high school precalculus courses to simultaneously earn university credit. We expect the number of high schools participating in this program to increase significantly in the future. In June 2000 the department offered SPECTRUM, a workshop for K-8 teachers who want to improve their mathematics teaching skills. An article about this workshop appears below. Finally, Gene Abrams gave a number of talks in various area high schools. The primary purpose of these talks is to try to convince students that it is in their best interests to continue their mathematics studies in high school for as long as possible.

We look forward to an exciting year. If you have any suggestions, comments, or ideas for ways that we can improve the program and the department, please do not hesitate to contact me

haefner@math.uccs.edu, or by dropping by the Math Department office in EAS 274.

CO-MAP Modeling Competition another huge success for UCCS

Last February UCCS had two teams participate in the 16th annual Mathematical Contest in Modeling. This competition is sponsored by a consortium of analytical organizations, including The Mathematical Association of America, The Society for Industrial and Applied Mathematics, and The National Science Foundation. There were 495 teams representing 231 institutions from nine countries.

The problems in this competition are generally open-ended, previously unsolved questions which have no specific "right" answers. Each team is handed two problems to choose from. In this year's competition, one problem concerned the Federal Aviation Agency. The team was to analyze the effect of adding software to the air traffic control system that would alert controllers to potential problems, and thus improve safety and reduce workload. The other problem sought to model the assignment of radio channels to a symmetric network of transmitter locations, so as to avoid interference.

Our first team, consisting of seniors **Kimberly Baker, Tyler Lievrouw, and Jesse Gilbert**, chose to work on the frequency assignment problem. For their effort they received a very commendable "Honorable Mention." This placed them somewhere between the 55th and 82nd percentiles. Our other team consisted of **Shane Holloway, Nick Sanford**, and Air Academy High School senior **Chris Dillenbeck**. (Chris was enrolled in Math 340 at UCCS at the time of the competition.) These three chose to work on the FAA problem. Their paper was scored "Meritorious" which placed them somewhere above the 82nd percentile. This was an outstanding performance.

The next competition will take place over the weekend of February 9-12, 2001. Nick Sanford is eager to return for his third competition and has offered to put his expertise to work as a 'player/coach' in helping new participants with

their preparation. In addition, graduate student Tyler Lievrouw will team with this year's organizer / coach **Jon Epperson** to work on the logistic preparations for the competition. If you or someone you know would be interested in participating on a UCCS team, please contact Dr. Jon Epperson, either by email epper@codenet.net, or by dropping a note at the math department office, or by calling Jon at home 488-0927.

Sandor Fridli

We are honored that Professor **Sandor Fridli** is visiting our department for the Academic Year 2000/2001. Professor Fridli's home institution is Eötvös University in Budapest, Hungary. This is the oldest university in the country (founded in 1635), and is generally considered to be the country's leading university. Based on some common interests in the area of Hardy Spaces, Sandor was invited by Keith Phillips and Jim Daly to come to UCCS to share ideas and conduct research. In addition, Sandor will teach both Calculus 1 and Calculus 2 this year.

"I met Keith twice, in 1998 and in 1999, in Hungary. The first time he visited our research group at Eötvös. The second time he took part in two conferences in Hungary. I knew him and Jim by their names even before 1998, because they had solved a longstanding problem proposed by one of my colleagues. It was about the characterization of the dyadic Hardy space. Jim and Keith gave an elegant proof of the conjecture by employing multiplier operator techniques."

Fridli, Phillips and Daly have a number of topics they plan to collaborate on this year. Each has an area of expertise that they can share with the others.

Sandor (pronounced 'Shawn-dohr') is accompanied during his visit by his wife Ildiko and 4 year old daughter Danci. Ildiko is a high school and college teacher in chemistry and biology. She has a Ph.D. in chemistry. The Fridli family has visited the United States before, most recently by spending the academic year 1995/96 in Tennessee.

"The three of us love Colorado", Sandor said. "The people, the city, and most of the time the weather as well. We are amazed by the

mountains and by the so many other beauties of nature nearby."

Haefner as campuswide leader

Jeremy Haefner has taken on two important and distinguished campuswide tasks. First, Jere was named Faculty Associate for Information Technology. In this position he is charged with establishing an Information Technology council that will make recommendations to the Chancellor and the Vice Chancellor of Academic Affairs. This council will also formulate a strategic plan for IT.

The other hat Jere is now wearing is as Faculty Associate for Teaching and Learning. The current primary responsibility in this role is as Interim Director of the newly reconstituted campuswide Teaching and Learning Center. The goal here is to provide assistance for any and all aspects of the improvement and advancement of teaching and learning on the UCCS campus.

Changes in the undergrad degrees

There has been some consolidation in the undergraduate degree programs offered by the department. In order to streamline our efforts and make advising and credit transfer more user-friendly for our students, the degrees B.A. Mathematics (through the LAS college) and B.S. Applied Mathematics (through the EAS college) have now been cloaked under one umbrella, called the Undergraduate Mathematics Program. The Program will be housed in the EAS college. Within the program there will be two degrees offered: B.A. in Mathematics, and B.S. in Mathematics. Although now housed in EAS, the B.A. in Mathematics will be essentially the same as the previous B.A. in Mathematics. Although now called B.S. Mathematics, this new degree will essentially be the same as the previous B.S. Applied Mathematics.

All of the faculty of the math department aim to be as helpful as possible when guiding students through the advising process. However, certain faculty have taken such tasks on as an official function. Specifically, questions about the undergraduate programs should be directed to a member of the department's Undergraduate Advising

Committee: Sarbarish Chakravarty, Jim Daly, or Greg Morrow.

New 'tracks' in the grad program

Last year the Mathematics Department undertook an extensive review of its graduate program. An important aim was to strengthen the program by making more explicit the linkage between the courses being offered and the career goals of our students. While the program was solid in the past, this exercise did result in a shift in some of our priorities, and the development of four tracks, which provide coherent program suggestions for students with clearly identified professional goals.

The four tracks are: K-14 education, computational and applied mathematics, business and management, and Ph.D. preparation. The education track includes some recently added courses on teaching with technology, a hot topic in education these days. The development of the computational and applied mathematics track includes a new emphasis on our old course on Partial Differential Equations (now called Methods of Applied Mathematics), along with the creation of a new course, Scientific Computation (offered for the first time this spring). The business and management track includes courses in business and economics in addition to mathematics, and is the choice for students considering actuarial work or other quantitative nonengineering careers.

The department also decided to provide some increased emphasis on computing skills for the graduate students. The current plan is to provide a mathematics-oriented course of independent study for graduate students who have insufficient expertise in computer science. This course, still under development, will try to provide a level of computing sophistication more or less at the level expected of the undergraduate applied mathematics majors.

Questions about the graduate program should be fielded by a member of the department's Graduate Committee: Bob Carlson, Keith Phillips, or Greg Morrow.

New Senior Capstone Requirement

As part of the campuswide move towards implementing a 'capstone experience' for majors in all disciplines, the math department has made the course Math 448: *Mathematical Modeling* a required course of all its majors. In addition, a 1 credit hour 'Senior Seminar' component has been added to this course. Although much of the course remains the same (e.g. homework, text), in the newly reconstituted Math 448 course students will be expected to 'read, write, and speak' in mathematics! In addition to honing the communications skills of our majors, this new approach will allow students with diverse educational backgrounds a chance to talk to each other and share their experiences. Students will complete an integrative independent study project on some aspect of modeling, and make both an oral and written presentation of their work. The entire mathematics faculty will be involved in the oral presentation process.

SPECTRUM 2000

The CU - Colorado Springs Department of Mathematics sponsored a weeklong workshop on the UCCS campus during the week of June 12 – 16, 2000. The title of the workshop was *SPECTRUM 2000: SPearheading Education, Consultation, and TRaining in the Usefulness of Mathematics*. This workshop was supported by a grant of over \$32,000 from the recently formed Colorado Institute of Technology. The purpose of the workshop was to help teachers at the elementary and middle school levels teach mathematics in a way that their students will find exciting and understandable. A total of 39 teachers from throughout Southern Colorado attended. Topics included number patterns, statistics, algebra, Internet projects, and a discussion of various mandated statewide tests in mathematics that K-12 students must undergo beginning this year. The five faculty presenters during this workshop were **Ardyce Putnam, John Putnam, Gene Abrams, Jim Daly, and Jeremy Haefner**.

CO-AMP

The Colorado Alliance for Minority Participation continues to have a strong presence at UCCS. As part of this program, **K.M. Rangaswamy** received an NSF grant of

\$36,000 for calendar year 2000; with these monies he ran a summer 'bridge' program in August 2000 for incoming minority students in Engineering and Sciences. Ranga earned a similar grant and helped organize a similarly successful workshop during Summer 1999 as well. CO-AMP's primary goal is to double in five years the number of underrepresented minorities (African American, Hispanic and Native American) students receiving baccalaureate degrees in Science, Mathematics, Engineering, and Technology in Colorado. It is supported by a 3 million dollar grant from the NSF for five years. Other CO-AMP goals include substantially increasing the quantity and quality of education for these students. The CO-AMP objectives include (i) Bridge Programs to facilitate a smooth transition for incoming freshmen and transfer students, (ii) Retention and Mentoring activities such as study skills workshops, tutoring, Supplemental Instruction and MESI, (iii) Undergraduate Research, and (iv) Recruitment.

Online tutoring

A new University of Colorado systemwide project got underway during Fall 2000. The Online Tutoring Project, a brainchild of **Jeremy Haefner**, began operations on 6 September 2000. This program provides real-time tutoring in precalculus for students at each of the three general CU campuses: Colorado Springs, Boulder, and Denver. The tutoring sessions occur using audio and whiteboard transmitted over the internet.

Mathematics Monthly Puzzler

The Math Department is glad to continue its sponsorship of the Mathematics Monthly Puzzler contest. This contest is open to all currently-enrolled UCCS undergraduate students. Students of all mathematical ability levels and backgrounds are encouraged to try their hand at the Puzzler. Written solutions to the Puzzler should be deposited in the Puzzler Box in the Math Learning Center (EAS 129). A \$20 Gift Certificate to the UCCS Bookstore is awarded to the student or team of students who submits the most creative, complete, and/or

interesting solution. Check the department's web site <http://mathweb.uccs.edu> for the current and most recent Puzzlers.

Newsletter Interview: Dr. Shannon Schumann



The newest member of the UCCS Math Department's family is Dr. **Shannon Schumann**. Shannon came on board in January 2000. Her official title is Director of the Mathematics Learning Center. We interviewed Shannon to find out something about her background, her impressions of UCCS, and her goals for the MLC.

Newsletter: Tell us a little bit about yourself.

Shannon Schumann: I grew up in Illinois. My initial foray into college was as a music major at a Junior College near my home; I loved to play the oboe! I didn't really think I had any special interest or talent in mathematics at the time. After two years of junior college I joined the Navy, mostly for the technical training they offered. I was stationed in Guam for six years! My job was essentially as an electronics technician, which meant I got to fix the old vacuum-tube radios.

While in Guam I went to college, where I first caught the "math bug". I had some great teachers who exposed me to some of the fascinating underpinnings of the subject (like multiplication of 'unreal' numbers, and formal axiom systems). The bug took hold so strongly that I decided to go on for a Ph.D. in math, which I completed in 1991 from the University of Wyoming. UW was perfect for me: a smaller program in a nice setting.

After earning my Ph.D. (my thesis was in an area of topology), I spent a few years as a mathematics faculty member in Oregon and Kentucky. But then the oboe bug struck again! I wound up as an undergraduate music major at the University of Kentucky, where I spent two years as the principal oboe in the university orchestra. After accomplishing all of my musical goals in this setting, I went back to teaching math at Centre College, a small liberal arts school in Kentucky. It was after a year at Centre that I saw an advertisement in the Chronicle of Higher Education for the MLC Directorship at UCCS. I jumped at the opportunity to move back to the Rocky Mountains and teach math in a challenging, rewarding environment.

NL: What is your vision for the Mathematics Learning Center?

SS: I would like the MLC to be a place where people can get together and talk about mathematics and related ideas. Of course the main focus of the Center is to offer drop-in tutoring help in mathematics for students across the campus. But I would also like to see people dropping by to chat about classes, math pedagogy, puzzlers, and those sorts of things in a comfortable, 'safe' environment.

NL: What sort of feedback have you been getting from the students who use the MLC?

SS: The vast majority of the feedback has been extremely positive. The tutors we have working in the Center are well qualified and quite motivated to help their peers. We have also gotten some extremely positive 'grade' feedback from MLC users. In fact, we have found that students who use the MLC services at least three times in a semester get, on average, more than 1/2 grade point higher in their math classes than those students who do not. (This is true even though the overall gpa's of these two groups of students is roughly equal.) I think this shows that the MLC has more than just a 'psychologically positive' effect.

One of my primary goals is to get more students using the MLC. The early results are encouraging: usage of the Learning Center has increased almost 30% between Fall 1999 and Fall 2000!

The MLC is always looking for qualified students to act as tutors. If any NewsLetter

readers are interested in such a position, I can be contacted at schumann@math.uccs.edu

NL: What are your hobbies and interests outside of mathematics?

SS: Of course I still retain a love for music. I also spend a lot of time hiking in the mountains. (In fact, the picture of me in this Newsletter was taken at the Red River Gorge in the Kentucky.) It's great to live in the Rocky Mountains again, a place where people are so in touch with the great outdoors!

Shirts and Hats

Yet another reminder that the UCCS Department of Mathematics logo has been incorporated in handsome golf shirts and caps! (The logo appears in the masthead of this Newsletter). The shirts and caps are black; the logo is in the school colors (blue and gold). To order: Shirts are \$18.98, Caps are \$16.00. Caps are one-size-fits-all; specify shirt size S, M, L, XL.