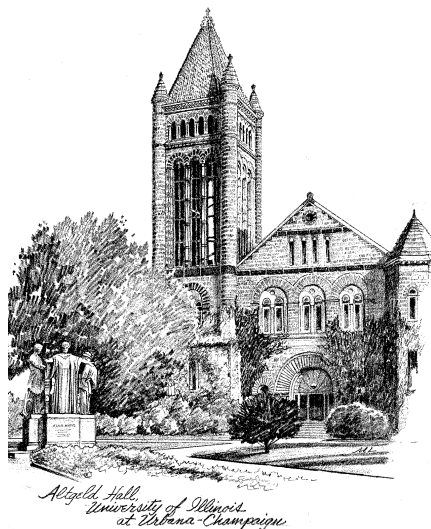


Math



Times

Department of Mathematics

Fall 2001

Letter from the Chair

We can all tell that the fall season is here. This term's classes are well under way, and many students are even taking their first midterm examinations. The Department's calendar of seminars and special talks is full. This includes a large number of people involved in RAPs, Research Among Peers, working seminars that are supported by the NSF VIGRE grant. And in our gardens we probably have seen the last hummingbird until next spring when they return from their southward journeys.

The NSF VIGRE grant continues to have a visible and significant impact on the research and teaching missions of the department. There is a new group of graduate students supported by the NSF VIGRE fellowships. Three new postdoctoral faculty members supported by the VIGRE grant have joined the department this fall. Indeed, the department now has 16 postdoctoral faculty members with a wide variety of research interests. This is an enormous change from four years ago when the department had no postdoctoral faculty at all. One of the most exciting developments of the VIGRE grant happened this summer: three group summer research experiences for undergraduates (REUs). These eight-week long programs had in total 26 participants. There was a group working in number theory with Professors A. J. Hildebrand and Alexandru Zaharescu, a group working in game theory with Professor Bob Muncaster, and a group working with Professor George Francis on geometry and geometric visualization. See our web site, particularly www.math.uiuc/VIGRE/reu, for more information about this new program. By the time that this newsletter has gotten to you, we will have had our first site visit for the NSF VIGRE program from a group of mathematicians (Carl Pomerance, Lucent

Technologies, Al Taylor, University of Michigan, and Carol Wood, Wesleyan University). This group was selected by the department to evaluate and critique our NSF VIGRE activities.

This year the department of mathematics hired nine new regular faculty members, six new postdoctoral faculty members, and a number of visitors. There are over 100 people doing research and/or teaching in the department this year. Also this year, there are a large number of retirements and departures already certain. So the department is continuing to meet the challenge of renewing itself through strategic hiring in a large array of different research specialties. By spring of next year, we hope to be able to report on an exciting and successful hiring season.

There are many more important facts that this newsletter will tell you about, but let me single out one of our news items: this summer we worked on upgrading all of the graduate student offices and a number of offices that are being used by the new faculty members who have joined the department this fall. Also, the remodeling of the basement of Coble Hall was completed and use of that space is now in full swing. We particularly need to thank Joyce Roberts, our business manager, for getting this work done so efficiently between the end of the spring term and the beginning of the fall term.

Once again, this coming January we will be having a reception for all UIUC Department of Mathematics alumni, past faculty members, and friends at the AMS National Meeting in San Diego. We hope to see you there, but in any case be in touch and let us know what you are doing!

University of Illinois at Urbana-Champaign

The Math Times is published twice a year by the Department of Mathematics at the University of Illinois at Urbana-Champaign. The *Math Times* is also available via the web in pdf format (go to www.math.uiuc.edu/mathtimes).

Editor	<i>Tori Corkery</i>
Asst. Editors	<i>Sara Nelson</i> <i>Beth Kibler</i>
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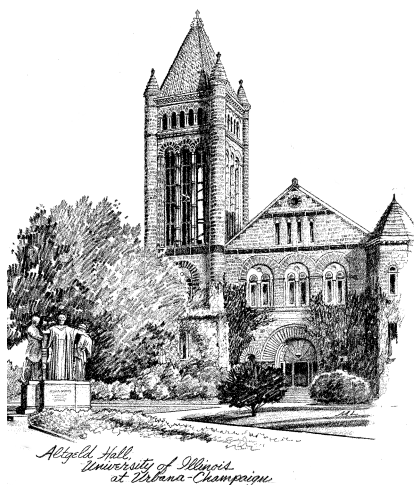
Address corrections and changes should be sent to:

Lori Dick
ldick@math.uiuc.edu
257 Altgeld Hall (MC-382)
1409 W. Green Street
Urbana, IL 61801

Department of Mathematics
Main Office
273 Altgeld Hall (MC-382)
1409 W. Green Street
Urbana, IL 61801

Telephone: 217-333-3350
Fax: 217-333-9576

office@math.uiuc.edu
www.math.uiuc.edu



Department takes over as publisher of Illinois Journal of Mathematics

The Illinois Journal of Mathematics (IJM) was founded in 1957 by R. Baer, J.L. Doob, A. Taub, G. Whitehead, and O. Zariski, and has quickly established itself as a preeminent journal of mathematics. The IJM has published many influential papers in the four decades of its existence, most notably the proof of the Four Color Conjecture by K. Appel and W. Haken. Distinguished researchers such as A. Calderon, S.S. Chern, H. Kesten, and K. Uhlenbeck have served as Editors of the IJM. The current Editorial Board consists of Stephanie Alexander, Jean Bourgain, Burgess Davis, Phillip Griffith, C. Ward Henson, A.J. Hildebrand, Craig Huneke, Joseph M. Rosenblatt, and Jang-Mei Wu, with Hildebrand serving as Managing Editor.

During the first few decades of its existence, the IJM was partially supported by the AMS and the University of Illinois. However, since the 1980s the IJM has been almost entirely self-supported through subscription income. The IJM is contributing to the Mathematics Library through an exchange program, whereby the library receives over 250 journals, valued at \$25,000, at no cost in exchange for subscriptions to the IJM.

The IJM is nearing completion of a major reorganization and expansion effort, aimed at shortening and streamlining the publication process, reducing the backlog of papers, and increasing the quality of the papers published in the journal and the reputation of the journal within the mathematical community. The changes include a major expansion of the journal, which now publishes nearly twice as many pages as a few years ago; the addition of an electronic edition (available at the journal's website www.math.uiuc.edu/~ijm/); a more attractive look with a redesigned glossy cover; and a number of operational changes.

The most significant operational change is that the UIUC Department of Mathematics has taken over as the publisher of the IJM, a service that was previously performed by the University of Illinois Press. The entire journal operation is now handled in-house, within the UIUC Department of Mathematics, under Debbie Broadrick, the Production Manager of the Journal. The IJM office is located in 247 Illini Hall.

The operational changes have resulted in significant cost savings and made it possible to expand the journal, while holding subscription costs nearly steady. As a result, the IJM is now one of the lowest priced journals in mathematics, both in absolute terms (\$135 per year) and on a cost per page basis. The subscription cost per page for the IJM is now 10¢, compared with around 20¢ for most AMS journals, and nearly \$1 or more for some commercial journals.

A permanent display with information about the history of the IJM, its founders, and editors has been placed in the Mathematics Library in Altgeld Hall. The display, which was put together this summer by the Graduate Assistant Candace Homco-Ryan, is located in the back of the reading room, to the right of the circulation desk. The displayed materials will be rotated periodically.

New award: Distinguished Research Professor of Mathematics

The Distinguished Research Professor of Mathematics awards, given for the first time in Fall 2001, have a dual purpose. The first purpose is to recognize senior members of the faculty for their outstanding achievements and to provide them more time to focus on their research activities. The second purpose is to honor distinguished department faculty members of the past for their contributions to mathematics as a whole and to the Department of Mathematics at the University of Illinois in particular. Each year the awards will be presented by the Executive Committee to at most two senior members of the department. The first recipients of this award are Robert Kaufman and Bruce Berndt.

Robert Kaufman, named the Lee Rubel Distinguished Research Professor of Mathematics, received his Ph.D. in 1965 from Yale University and joined the UIUC Department of Mathematics in 1965. Professor Kaufman's research interests are in the area of analysis, including classical analysis, complex function theory, Hausdorff measure, and analytic sets. Six doctoral students have completed their Ph.D. under his direction.

This award was named in honor of **Lee A. Rubel**. Professor Rubel joined the UIUC Department of Mathematics in 1958. He retired in 1993 to devote all his time to research. Professor Rubel received his doctorate in mathematics in 1954 from the University of Wisconsin, Madison. He was the author of more than 200 journal articles and two books, most of which dealt with complex analysis and differential equations. Rubel's work on the mathematical theory of the extended analog computer gained attention from computer scientists throughout the world. He was an editor of the Proceedings of the American Mathematical Society from 1972 to 1973, the Illinois Journal of Mathematics from 1974 to 1982, the International Journal of Mathematics and Mathematical Sciences from 1981–1995, and the

Transactions of the Illinois State Academy of Science from 1982–1983. Professor Rubel advised 14 doctoral students while with the department. He died March 25, 1995.

Bruce Berndt, named the Michio Suzuki Distinguished Research Professor of Mathematics, received his Ph.D. in 1966 from the University of Wisconsin and joined the UIUC Department of Mathematics in 1967. Professor Berndt is an analytic number theorist with strong interests in several related areas of classical analysis, including special functions, classical modular forms, elliptic functions, q -series, and continued fractions.

Since early 1974, almost all of Professor Berndt's research has been devoted to proving the claims left without proofs in three notebooks by India's greatest mathematician, Srinivasa Ramanujan. Currently, four Ph.D. students are writing their dissertations under Professor Berndt's direction. Seventeen other students have completed their Ph.D.'s under his direction.

This award was named in honor of **Michio Suzuki**. Professor Suzuki joined the UIUC Department of Mathematics in 1953. Professor Suzuki, an early leader in the effort to classify finite simple groups, died May 31, 1998, in Tokyo. He obtained his Ph.D. from the University of Tokyo in 1952 with Shoukichi Iyanaga as his official advisor. He took a leave of absence from the UIUC to work at Harvard University with Richard Brauer. He was a professor in the UIUC Center for Advanced Study from 1968 until his death. He was awarded a Guggenheim Fellowship in 1962–63, received the Academy Prize from the Japan Academy in 1974 for his work in group theory, and was awarded an honorary doctoral degree from the University of Kiel, Germany, in 1991. While with the UIUC Department of Mathematics, he advised 25 doctoral students.

Training underway for 62nd Putnam competition

Training sessions are underway for UIUC participants in the 62nd annual William Lowell Putnam Mathematical Competition. This contest, which is open to undergraduate students at U.S. and Canadian universities, attracts nearly 3000 participants. Local organizers for the competition are Professors H. Diamond and A.J.Hildebrand of the UIUC Department of Mathematics.

The Putnam competition is a six hour contest consisting of twelve challenging problems. Considerable ingenuity and insight are required for success, but many

problems involve little technical knowledge beyond high school mathematics. By tradition, the competition is held on the first Saturday of December.

Last year, the UIUC team ranked 35th out of 434 participating institutions. The top scorers among the 13 UIUC participants were Kaushik Roy, then a senior in Engineering, and David Dueber, then a junior in LAS, who ranked 106th and 120th, respectively, among the 2800+ competitors, with scores of 33 and 31 points out of a possible 120.

Friedman receives distinction on Mathematics Tripos exam

Brad Friedman, who was awarded one of 10 Churchill Foundation Scholarships for U.S. students for the 2000–2001 academic year to study mathematics at Cambridge University, sat for Part III of the Mathematics Tripos this past summer. He received a mark of distinction on the exam. Friedman will begin work on his Ph.D. in algebraic combinatorics at MIT this fall.

Friedman had a distinguished career as a mathematics major at the University of Illinois. He took Math 347, Real Analysis, one of the most difficult undergraduate mathematics courses, as a first semester freshman. He worked his way through most of the required courses for the major by passing proficiency exams. He took the graduate algebra course Math 401 at the start of his third year. During this time, he was also completing a degree in performance piano for which he has won several awards. In his third year, he was appointed as an undergraduate teaching assistant, a position granted each year to only a few outstanding undergraduate mathematics majors. He received the Brahana Prize in 1999, which is awarded to an undergraduate with the most outstanding career in mathematics. He was the winner of the 1999 UIUC Undergraduate Mathematics Contest, and was a successful competitor in the W. L. Putnam Undergraduate Mathematics Competition in 2000.

Department welcomes 53 new graduate students this fall

Fifty-one new graduate students joined the department this fall from around the world coming from China (10), Colombia (1), France (1), Germany (1), Hungary (1), India (1), Japan (2), Korea (8), Poland (1), Russia (1), Singapore (3), Taiwan (3), Turkey (1), USA (16), and Zambia (1). This brings the total number of graduate students in the department to 199 (144 male, 55 female).

Five of our incoming students were awarded fellowships. New VIGRE Fellows are Elizabeth Gallery (Penn State), David Rose (University of the South) and Jacent Tokaz (Virginia Tech). New students receiving University Fellowships are international students Song Heng Chan (Singapore) and Reka Santhanam (Indian I Tec, Bombay).

All 22 students who were awarded Ph.D. degrees in May and October 2001 found employment and seven received postdoctoral fellowships at prestigious institutions.

Department awards presented

The Department of Mathematics awards ceremony was held April 25, 2001 in Altgeld Hall. Award recipients were reported in the Spring issue of the *Math Times*. However, several award results were not available for the spring issue and are included here.

Department TA Instructional Award

David Murphy and **Radhika Ramamurthi** were the recipients of the 2001 Department TA Instructional Award. Ramamurthi, then a 6th-year student studying graph theory and combinatorics with Professor Doug West, has taken a postdoctoral position at UC-San Diego. Murphy, then a 5th-year student, is studying algebra with Professor Robert Fossum. A committee of faculty, graduate students, and undergraduate students determines the winners. Awards are based on classroom observation, comments from students, and a written report by the nominees describing their teaching goals.

David Murphy also received the Delta Sigma Omicron Distinguished Teaching Award. The award was presented at the Instructional Awards Banquet held April 30, 2001.

2001 UIUC Undergraduate Math Contest

The 2001 UIUC Undergraduate Math Contest was held Saturday, April 21, 2001. **Thomas Aref**, **Michael Baym** and **Ken Scheiwe** tied for first prize. The contest, formerly called the Orange and Blue Contest, is similar in format and content to the Putnam competition.

Mathematica on exhibit at San Francisco exploratorium

If you're taking a trip to San Francisco, be sure to visit the math exhibit "Mathematica: A World of Numbers and Beyond," a reprise of a classic 1961 exhibition by famed designers Charles and Ray Eames, who wanted to turn math on its ear and help people see it as cool and fun.

"The show's designed to be a nonthreatening approach to math and geometry without having to go through all the stuff you went through in school...without pressure, without any tests." The show will run through May 5, 2002 at the San Francisco Exploratorium (www.exploratorium.edu). Be sure to take the kids.

Actuarial science program to hire faculty

The Actuarial Science Program has been a part of the Mathematics Department for decades, since Professor Peters began teaching the theory of interest and life contingencies to a few interested students. In the late 1960's, a separate major in actuarial science was established, but classes were quite small until the 1980's. Undergraduate enrollment peaked at 225 in 1991 shortly after publication of the Jobs Rated Almanac listing "actuary" as the number one job overall. Enrollment has since dropped back to about 110.

Alumni of the program are vice presidents at such firms as CIGNA, First Southwest Investments, and National Life Insurance (of Montpelier VT), and are associates or partners at consulting firms such as Hewitt, Mercer, and Towers Perrin. Some are pursuing careers in other areas, including teaching.

The program was delighted in 1999 to hire a second professional actuary (Rick Gorvett, Ph.D., FCAS) for the

faculty, but he was subsequently lured back into industry, and we are recruiting for a position to begin in Fall 2002. Check the ad at <http://www.math.uiuc.edu/Positions/actsai.htm>. For more information about the program visit <http://www.math.uiuc.edu/UndergraduateProgram/curricula/actuarial.html>.



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Editorial: Role of teaching at a research university

By Bruce Reznick

Professor, UIUC Department of Mathematics

Last year, my alumni newspaper, the Caltech News, asked its readers to comment on the role of teaching at a research university. They published my response, and here's some of what I had to say. [My criticisms of "education innovation" are not intended to criticize any of the work done in our department; the C&M project, for example, is genuinely innovative and has been of great value to the mathematical community.]

I have two types of answers to the question of how the twin responsibilities of teaching and research conflict and complement each other. These depend on whether you are interested in talking about the ideal university, or the university in the real world.

The ideal university is a community consecrated to the creation, transmission and preservation of facts, knowledge, culture and wisdom. The university in the real world does many things which are done by other institutions in our society, but is unique in its respect for the love of learning wherever learning occurs—in the classroom, in the library, in the laboratory, at our desks. Learning in the real world university is respected as a legitimate end in itself, as well as a means to other ends. The enterprise of scholarship takes a great deal of dedicated effort by many people.

One transcendent moment of pure intellectual insight will make students feel their college education was worthwhile; three or four will turn them into scholars. These moments are difficult to measure, and so are difficult for administrators to manage. This does not make them valueless! Furthermore, it is difficult to translate these moments into any sort of coherent planning model for the university or reward structure for the faculty. Universities could learn a lot by polling graduates at their 50th reunion to identify the teachers who had had the greatest impact on their lives. But then what?

Ideally, teaching helps you do research and research helps you teach. You gain a much deeper understanding of your subject when you have to explain the basics to students for whom it is not so obvious. You are forced to broaden the part of your subject with which you are readily conversant and this helps your research immensely. At the same time, research brings a steady stream of new examples into your teaching, and most importantly, creates the sort of intellectual open-endedness which uniquely distinguishes education from training. However much you learn, the best college courses leave you aware of how much more you do not know.

In the real world, however, one only has 24 hours in a day. Universities are famous for continually piling new duties on their faculty without ever removing old ones. Administrators laughingly refer to the "juggling act" of research, teaching, committee work, service to one's profession, professional service to your community, (lately) contributions to regional economic development, etc., let alone one's responsibilities as a family member, a citizen, a sentient human being. The unexamined life will not always wait for summer break.

I learned from my Caltech anthropology course that some primitive cultures believe in the "principle of limited good." Many academics have a similar "principle of limited enthusiasm," under which an interest in teaching may suggest an unhealthy lack of interest in research. And much of the heavy lifting of teaching, especially dealing with weaker students, contributes nothing to one's research except the exhaustion of time to do it. If you are a mediocre teacher, but not a disaster, your career in a research university will not suffer. If you are a mediocre researcher, but not a disaster, tenure at a research institution can seem like a sentence, and, no matter how good a teacher you are, the best career path may be to apply for that position of assistant to the acting associate vice provost.

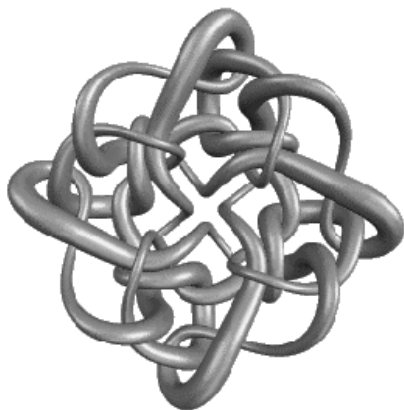
I have to add that an interest in educational innovation, while necessary and valuable, can also serve as a distraction from the job of teaching. Many universities, such as my own, have been devoting great amounts of resources towards developing new curricula, modes of instruction, etc. They are strongly supported by the NSF and other funding agencies, both private and public. For a variety of reasons, a marginally successful innovation is apparently more desirable than an extremely successful ongoing program. With the flurry of grant proposals, conferences, evaluative paradigms and panel discussions, the educational reform community is often a translation of the research culture, with too little emphasis on the student. It's not surprising: our culture treasures structural innovation and cannot easily see that even in the most traditional setting, if the material is new to the learner, then it's new, period. New programs also allow administrators to share the stage. I can't say that the way we teach now is immune from criticism or improvement, but the limiting resource preventing better teaching at the university has never been a shortage of good ideas, but a shortage of will in implementing the good ideas that we

already know work and directing the minds of the faculty towards the minds that face us in the classroom.

It is unmistakably clear from the inside that the reward structure at the research university is tilted towards research: this is the filter by which job candidates are screened, it is the basis for promotion and tenure and most salary raises. I have been fortunate to have been rewarded financially for my teaching, as well as my research, but a narrow economic analysis would have compelled me to spend less time teaching, and more time writing grant proposals. My weakness is that I find something irresistible in becoming Scheherazade with a syllabus, trying to tell the wonderfully interlinked stories of mathematical discovery and keep the students' attention through the two thousand and one minutes of a semester.

Whose fault is the displacement of learning from its deserved central role in the university? Everybody's. The faculty who look at fame, pleasant working conditions or financial reward as their goal (and where do we get that idea?); the administrators whose bean-counting souls reduce research, teaching and service to outside funding, credential validation and press releases; the alumni donors, who do not often fund chairs for great teachers or modernized classrooms, but rather, fund chairs for great researchers and new laboratory buildings. Hmm. Anybody out there getting some ideas?

Bruce Reznick, a professor in the Department of Mathematics, joined the UIUC mathematics faculty in 1979. His research interests usually involve combinatorial methods in algebra, analysis, and number theory. He received his Ph.D. from Stanford University in 1976.



IVHS to offer online calculus

NetMath in cooperation with the Illinois Virtual High School (IVHS) will offer online calculus beginning this semester. Eligible high school seniors can enroll in the course for college credit.

NetMath is a program through the Department of Mathematics and the Division of Academic Outreach which has been offering on-line math courses to high school students, adult learners and professionals for the past 10 years. Hundreds of students have completed one, two, or three college-level calculus courses prior to finishing high school.

NetMath is taught using the award winning Calculus&Mathematica courseware. The courseware is written in Mathematica, a powerful computer algebra system which allows students to combine graphics, symbolic manipulation and numerical computation. It also allows for a strong writing component to the course. There are no lectures, but rather students are placed in an active learning environment. Distance students participate in online discussions through chat rooms, e-mail, electronic forums, and Timbuktu remote computer control sessions. Lessons are self-paced. A visual approach to calculus is used, allowing students to see and compare functions through dynamic graphs and animations. Online students are taught in the same way as the students enrolled in the Calculus&Mathematica sections on campus.

As one NetMath student put it, "[NetMath Calculus] has given me the confidence that I needed to believe that I can succeed in college.... The challenge of understanding is what kept me looking forward to it and that is what is the best thing about this class.... I believe this has been one of the most interesting and advantageous experiences I could have possibly had in high school."

For more information, please contact netmathinfo@cm.math.uiuc.edu.

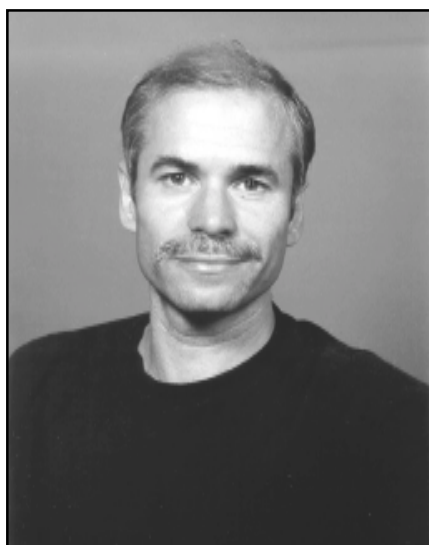
2002 calendars available

The Department of Mathematics has designed 2002 calendars highlighting famous mathematicians of the past. The calendars are free to members of the department and those on the *Math Times* mailing list. If you would like a 2002 calendar, please send an e-mail to mathtimes@math.uiuc.edu. Be sure to include your name and a full mailing address.

Department welcomes fifteen new faculty and postdocs this fall

The department is pleased to introduce the new faculty and postdocs that joined the department this fall.

Sheldon Katz, Professor of Mathematics and Physics, received his Ph.D. at Princeton in 1980. Before coming to UIUC, he was at Oklahoma State University, the University of Oklahoma, and the University of Utah. He also held visiting positions at the Institute for



Sheldon Katz

Advanced Study, University of Bayreuth, Duke University, and Mittag-Leffler Institute. His areas of specialization are algebraic geometry and string theory.

Slawomir Solecki, Associate Professor, came to the department this year from Indiana University, Bloomington, where he was an Assistant Professor. He received his Ph.D. at the California Institute of Technology in 1995. His research interests are mathematical logic, descriptive set theory, real analysis, and general topology.

Assistant Professors joining the department are:

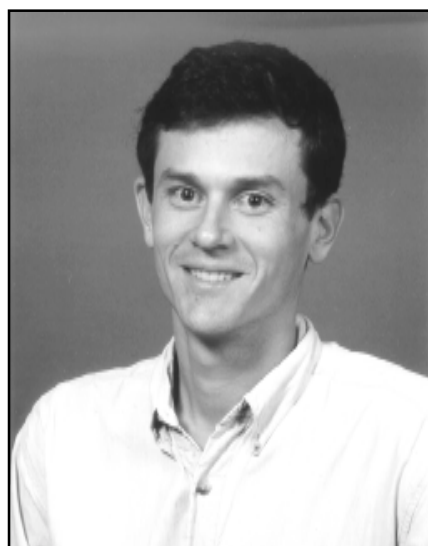
Scott Ahlgren arrived at UIUC from Colgate University, Hamilton, NY, where he was an assistant professor. Prior to that he was a visiting assistant professor at Penn State University and Denison University. He received his Ph.D. in 1996 from the University of Colorado, Boulder. His area of specialization is number theory, particularly in the application of the theory of modular forms to problems in number theory. Ahlgren has

established himself as an extremely able mathematician since completing his Ph.D., publishing or submitting for publication 17 research articles. He enjoys almost all outdoor activities (running, hiking, golf, skiing, etc.) plus cooking, but most of all he enjoys spending time with his wife Alison and children, William (3 yrs) and Katherine (9 mos), as well as Bessie the family dog. After 9 moves in 9 years, Scott is happy to settle down in Urbana-Champaign.

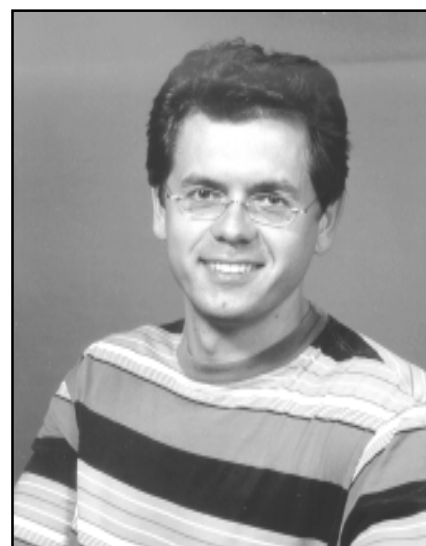
Robert Bauer returns to UIUC after receiving his Ph.D. here in 1997 under the supervision of Don Burkholder. After receiving his degree, he held a postdoctoral position at the IAS in Princeton and then at the Georgia Institute of Technology. His areas of specialization are stochastic processes in differential geometry and mathematical physics. This fall, in addition to teaching, he is co-organizing with Professor Renming Song an RAP on conformal invariance, intersection exponents and critical percolation. His hobbies include music and hiking.



Slawomir Solecki



Scott Ahlgren



Robert Bauer

Ilia Binder was a Benjamin Peirce Assistant Professor at Harvard prior to coming to the department. He completed his Ph.D. under the supervision of Mikolai Makarov at Caltech. Dr. Binder specializes in complex analysis, particularly in the boundary behavior of the classical harmonic measure.

Florin Boca was a research fellow of EPSRC in the School of Mathematics at Cardiff University, U.K., before coming to UIUC. He received his Ph.D. in 1993 while working with Sorin Popa at UCLA. He has wide ranging interests in operator algebras, number theory, and mathematical physics.

Kevin Ford received his Ph.D. in number theory at UIUC in 1994 under the direction of H. Halberstam. Since receiving his degree and prior to coming to UIUC, he held positions at the University of Texas at Austin, the Institute for Advanced Study, Princeton, NJ, and the University of South Carolina at Columbia.

Rinat Kedem was an Assistant Professor at the University of Massachusetts prior to coming to UIUC. She received her Ph.D. in mathematical physics in 1993 from SUNY-Stony Brook, and held postdoctoral positions at UC-Berkeley and Kyoto University. She specializes in mathematical physics, representations of affine algebras and their deformations, and integral models in statistical mechanics and quantum field theory. Kedem is spending fall semester on leave at the Institute for Pure and Applied Mathematics (IPAM) conformal field theory program and will arrive at UIUC in the spring of 2002.

Charles Rezk joined the department this fall after spending last year at the Institute for Advanced Study. He received his Ph.D. from MIT in May 1996, where he was awarded a Sloan Doctoral Dissertation Fellowship. Prior to last year he was a visiting Assistant Professor and Lecturer at Northwestern University. His research specialization is algebraic topology.



Rinat Kedem



Charles Rezk



Ilia Binder



Florin Boca



Kevin Ford

J.L. Doob Postdocs

The J.L. Doob Research Assistant Professor appointments are named for Emeritus Professor Joseph L. Doob, a long-time member of the department who received the Presidential Medal of Science. Two to three new Doob postdoctoral appointments have been made each year since 1997. Three new Doob postdocs joined the department this fall. They are:

Bernhard Lamel was on a European Union research fellowship in

Stockholm prior to coming to UIUC. He received his Ph.D. in 2000 from the University of California at San Diego. His research is in the area of geometry and several complex variables, with his primary interest in properties of mappings of real submanifolds in complex spaces of different dimensions.

Jorge Rivera-Noriega, a native of Mexico City, Mexico, received his Ph.D. from the University of Missouri-Columbia in 2001. His area

of research specialization is harmonic analysis and partial differential equations. This fall he's teaching Math 130 and Math 385.

Evgueni Vassiliev received his Ph.D. in 2001 from the University of Notre Dame, Indiana. Prior to that he received his M.S. (1996) and Diplom (1994) at the Novosibirsk State University, Novosibirsk, Russia. His research specializations are logic and model theory (geometric stability/simplicity theory).



Bernhard Lamel



Jorge Rivera-Noriega



Evgueni Vassiliev

New Faculty, continued

Xuixiong Chen, who will join the faculty in Fall 2002, is currently an Assistant Professor at Princeton. He received his Ph.D. in 1994 from the University of Pennsylvania. His areas of specialization include geometry/topology, complex analysis, and applied math.

In most sciences one generation tears down what another has built and what one has established another undoes. In mathematics alone each generation builds a new story to the old structure.

—Hermann Handel

VIGRE Postdocs

Funding for the VIGRE Research Assistant Professor appointments began in Fall 2000 with a grant received from the National Science Foundation. Each appointment is for three years. Three new VIGRE postdocs joined the department this fall. They are:

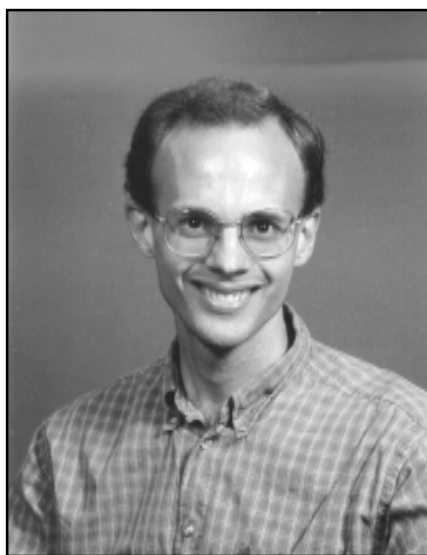
Alica Miller received her Ph.D. from Michigan State University in May 2001 in the area of topological dynamics. At Michigan State she

worked as a teaching and research assistant and received a Dissertation Completion Fellowship. Raised in Sarajevo, Bosnia by a Bosnian mother and an American father, she comes from a family of mathematicians—both parents, sister and husband are mathematicians, all in different areas.

Christopher French received his Ph.D. in algebraic topology from the University of Chicago. His thesis

“The equivariant J-homomorphism” was completed under the direction of Professor J.P. May.

David Sherman comes to UIUC from UCLA, where he received his Ph.D. in 2001. His area of specialization is operator algebras, especially the modular theory of von Neumann algebras. He was just married in July.



Christopher French



Alica Miller



David Sherman

Alumni After Math

If you have news to contribute to Alumni After Math, please complete this form, send it on a separate sheet, or e-mail to Tori Corkery, Editor, *Math Times*, 263 Altgeld Hall, 1409 W. Green St., Urbana, IL 61801, or e-mail: mathtimes@math.uiuc.edu

Name _____

Address _____ City, State, Zip _____

Phone _____ E-mail: _____

Yr. of graduation _____ Degree _____

Your news _____

Department welcomes visiting faculty and scholars from around the world

This Fall the department also welcomes a great many distinguished visitors and scholars. Visiting Professors include:

Manfred Denker is a Professor at Georg-August-Universität Göttingen, Germany (Ph.D., University of Erlangen-Nuremberg, Germany, 1972). Research interests: probability theory, dynamical systems, ergodic theory, fractal geometry. Denker plans to return over the next few years each fall to teach and do research here at UIUC. Professors J. Rosenblatt and Denker are developing a cooperative exchange between the Department of Mathematics and the Mathematical Institutes at the University of Göttingen. This exchange program will give opportunities to faculty members and graduate students to study and do research at both institutions.

Vishwa Dumir (Ph.D., Ohio State University, Columbus, 1965), currently a professor at Punjab University, India. Research interests: number theory

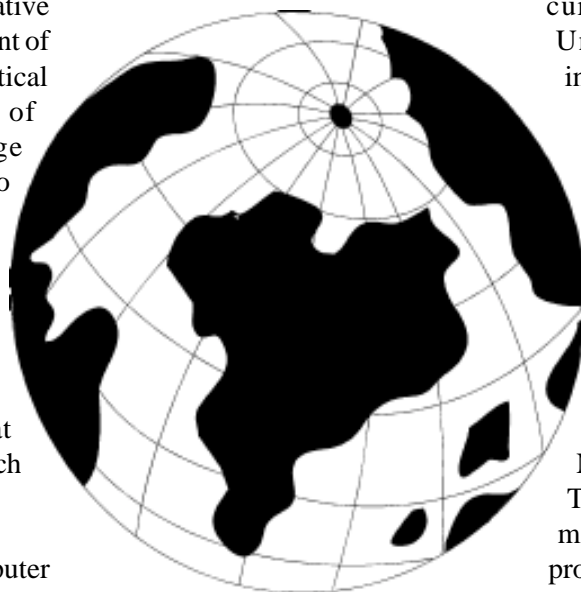
Nikolai Kuzjurin (Ph.D., Computer Center of Academy of Sciences of the USSR, Moscow, 1980), Russian Academy of Sciences, Moscow. Research interests: combinatorics.

Vitaly Voloshin (Ph.D., Cybernetics Institute of the Ukrainian Academy of Sciences, Kiev, Ukraine, 1983), Institute of Mathematics and Computer Science, Moldavian Academy of Sciences. Research interests: combinatorics.

Denka Kutzarova (Ph.D., University of Sofia, Bulgaria,

1983), here as a Visiting Associate Professor, is a Senior Research Fellow at the Institute of Mathematics, Bulgarian Academy of Sciences. Research interests: functional analysis; specializes in the geometry of Banach spaces.

Visiting Assistant Professors are: **Ioana Boca** (Ph.D., University of Southern California, 1995), University of Bucharest in Romania. Research interests: noncommutative algebra.



Svetlana Butler (Ph.D., Northern Illinois University, 2000), currently an instructor at Northern Illinois University, Dekalb. Research interests: functional analysis.

Lisa Murphy (M.S., UIUC). Research interests: math education.

Kim Whittlesey (Ph.D., University of California at Berkeley, 1998), Ross Assistant Professor at Ohio State University. Research interests:

mapping class groups and related groups.

Ae Ja Yee (Ph.D., Korea Advanced Institute of Science & Technology, 2000), Korea Advanced Institute of Science & Technology. Research interests: combinatorics and number theory.

Visiting Scholars to the department this fall include: **Kazushi Ahara** (Doctor of Science, Tokyo University, March 1992), currently a lecturer at Meiji University, Japan. Research interests: topology

Ilyas Akhisar (Ph.D., Istanbul Technical University, 1998), Assistant Professor, Marmara University, Istanbul. Research interests: mathematics engineering.

Yi-Wu Chang, Professor, Mathematics Department, National Chengchi University, Taiwan. Research interests: applied mathematics. Wife of visiting professor In-Jen Lin.

Piotr Kowalski (Ph.D., University of Wrocław, Poland, 2001), Mathematics Institute, Uniwersytet Wrocławski, Poland. Research interests: logic — groups definable in differential and difference fields; model theory of compact complex spaces.

In-Jen Lin, Professor at the National Taiwan Ocean University. Research interests: mathematics, computer science. Husband of visiting professor Yi-Wu Chang.

Summer mathematics REU program at UIUC

The Department of Mathematics at the University of Illinois at Urbana-Champaign began a new program of summer REUs (Research Experience for Undergraduates) in the summer of 2001. Twenty-six students from many different places in the country participated in this program, working in three different research groups. This program was extremely successful.

The Department of Mathematics wants to continue to offer this opportunity for undergraduate students. It is a good program for students interested in careers in the mathematical sciences. It is also a valuable and visible program for the University of Illinois to support. The program was started using funding from NSF, but even for this first year the funding was not adequate to cover all of the costs. A source of continued funding for this program is needed to allow it to continue.

The VIGRE grant included support of \$2,700 per student for summer REUs. The first three years of the grant have sufficient funds for 36 students to have such experiences. The Department of Mathematics supplemented these awards so that the total stipend was \$3,200 in the summer 2001 programs. The students paid for their own travel, housing, and board out of this stipend.

The initial plan was to have summer REUs, in groups of about 18 students each time, during the summers of 2001 and 2002 since the

funding for the UIUC VIGRE program came too late to advertise and run a program in the summer of 2000. The demand for the summer program for 2001 was so great, with 26 participants from all around the country, and all of the summer REUs were so successful this first time, that an expansion of the program to accommodate between 20 and 30 students is being planned for subsequent years.

The summer 2001 REUs included:

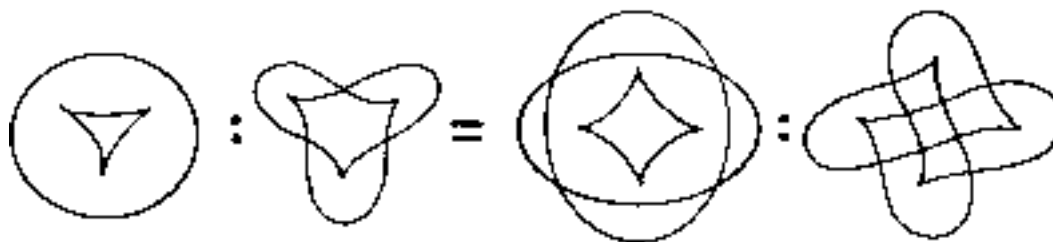
Professor George Francis organized a summer group REU around computational mathematics and computer visualization that had nine students. Dr. Karen Shuman, one of our NSF VIGRE postdoctoral faculty members, assisted him. Visit the website www.new.uiuc.edu/im2001 for further information about this program. This group's participants were: Benjamin Bernard (UIUC), Benjamin Farmer (UIUC), Mark Flider (UIUC), Douglas Nachand (UIUC), Alison Ortony (UIUC), Lorna Salaman (U. of Puerto Rico), Benjamin Shanbaum (UIUC), Robert Shuttleworth (Youngstown State), and Matthew Woodruff (UIUC).

Professor Bob Muncaster conducted a group REU focused on game theory, Markov chains, and basic evolutionary theory that had 10 participants. This group REU was

built from the continued involvement of Professor Muncaster with faculty members in the Department of Political Science. This group's participants were: Tina Carpenter (U. of Idaho), Ethan Coon (U. of Rochester), William Cuckler (UIUC), Pritam Dalal (UC-Berkeley), Natasha Fast (UIUC), Tom Ferrone (UIUC), Asher Kach (UIUC), Matthew Lee (Harvard), Stephanie Olson (UIUC), and David Smyth (UIUC).

Professors A.J. Hildebrand and Alexandru Zaharescu supervised a group REU in number theory with seven students. The program consisted of short courses and lectures, weekly seminars, group meetings, individually supervised research, and concluded with two sessions of student presentations. The two short courses were on Farey Fractions and Applications and on Finite Automata in Number Theory. This group's participants were: Rich Astudillo (UIUC), Evan Borenstein (U. of Virginia), Michael Comerford (Princeton), David Dueber (UIUC), Alan Haynes (UT Austin), David Weaver (UNC-Chapel Hill), and Jiashen You (U. of Hawaii).

Many more REUs are planned for future years in areas such as geometry, real and complex analysis, logic, combinatorics and graph theory, number theory, and topology and fractal geometry.



Faculty Notes

In July, the UI Board of Trustees approved promotions effective August 21, 2001. Receiving promotion to the rank of Associate Professor in the department were **Robert Jerrard, Richard Laugesen, Richard Sowers,** and **Susan Tolman.**

Steven Bradlow has been selected as an Associate in the Center for Advanced Study for 2001-2002.

Robert Fossum has been elected to a one-year term as Chair of the UIUC Senate.

Over a dozen mathematics faculty made the *Incomplete List of Teachers Ranked as Excellent by their Students* for the Spring 2001 semester. They are: **Stephanie Alexander, Matt Ando, Michael Bennett, Jared Bronski, Harold Diamond, Rick Gorvett, Dan Grayson, Ward Henson, Richard Laugesen, Esther Portnoy, Paul Schupp, Richard Sowers,** and **Doug West.**

George Francis gave a talk at Arnold Ross's 90th birthday conference at Ohio State University, Columbus, in July. Other summer activities included running the illiMath2001 RAP.

In the summer, **Aimo Hinkkanen** gave talks at Bar-Ilan University and the Technion in Israel, and at the conference on Complex Analysis and Dynamical Systems in Karmiel, Israel. He also gave a talk at the Conference on Computational Methods in Function Theory at the University of Aveiro, Portugal. He visited the American University in Cairo, Egypt, as well as the Universities of Helsinki and Joensuu in Finland, and joined the Summer School on Complex Difference Equations at the Mekrijarvi Research Station of the University of Joensuu.

In June, Professor **Peter Loeb** gave talks about his research in Prague in the Czech Republic, and in Frankfurt, Bielefeld, Munich, and Tuebingen in Germany. He also gave a series of talks during his month long appointment as a Visiting Professor at the National University of Singapore in July and August.

Derek Robinson gave a talk at the group theory conference "Groups-St. Andrews at Oxford."

Julian Palmore served as Chair of the AMS judges panel at Intel-International Science and Engineering Fair in San Jose, CA, in May. He was one of 24 faculty invited nationwide to participate in a workshop on Teaching Strategic Studies sponsored by the Johns Hopkins University, held at Basin Harbor, VT, in June. He lectured at a mathematics workshop in Goettingen, Germany in June on Schwarzian derivatives in iteration theory. Palmore was a guest of the Defense Resources Management Institute in Monterey, CA, in August to discuss ballistic missile defense studies and at the Monterey Institute for International Studies. In October, he was an invited speaker at the AMS special meeting.

TA peer mentoring program

The Department of Mathematics' TA Peer Mentoring Program, now in its second year, provides support and resources for new graduate teaching assistants. Its goal is to help TAs develop as teachers, thereby improving their own professional qualifications, enhancing the quality of teaching in the department, and making the job of being a TA a bit easier.

The TA peer mentors are successful, experienced mathematics TAs who have been trained in providing feedback, support and information for instructors. Each new TA with a classroom assignment is assigned a mentor and continues in the mentoring program for the first two semesters of teaching. Activities include informal discussions with the mentor, department-sponsored workshops on teaching, consultations on mid-semester and end-of-semester student evaluations, visits to the classroom by the mentor, and visits by new TAs to other TA-taught classes.

The TA mentors for 2001–2002 are Mark Anderson, Serguei Chebalov, Jason Gibson, Xiaosheng Li, Dominika Polkowska and Andrew Rizzo. The mentoring program is again supported by a grant to Professors Karen Mortensen and Paul Weichsel from the Provost's Initiative on Teaching Advancement. The director of the program is Karen Mortensen.

Nigel Boston continues work in cryptography

by Margot Jerrard

More and more information is being sent on the internet, encrypted using various cryptosystems. "There is a huge need to keep this information secure," says Professor Nigel Boston, Director of the new Illinois Center for Cryptography and Information Protection (ICCIP). Established on the UIUC campus in November 2000, the ICCIP is the first multidisciplinary center for information security in the U.S.

A number theorist, Boston first got interested in coding theory when looking for a research area for a former student of his, Judy Walker, who received her Ph.D. from the UIUC in 1996. Boston and Richard Blahut, a coding theorist in the UIUC Department of Electrical and Computer Engineering, realized that cryptography was becoming even more important than coding theory, and so teamed up to promote it.

Two new assistant professors in mathematics who joined the department last fall, Iwan Duursma and Andreas Stein, are working at ICCIP along with Boston and faculty members from computer science and electrical engineering to devise efficient and secure public-key cryptosystems to ensure that information sent remains confidential. "The enormously growing use of cryptography depends on advances in theoretical mathematics," says Boston. By using algebraic curves over finite fields, an area where number theory and algebraic geometry intersect, he and the others at the center are involved in searching for encryption systems that people will be able to use which will ensure that the information they send out remains secure.

In any system using codes, human beings are the weakest link. Boston explains that is why they are trying to automate as much as possible to cut down on the possibility of human errors. The main system, called RSA after the people who devised it, relies on our inability to factor large integers. This public-key cryptosystem has recently been successfully attacked by advanced algebraic number theory.



Professor Nigel Boston

In this RSA system, the person receiving messages has a public and a private key. Anyone wishing to send him encrypted information uses the public key to encipher it. It can only be deciphered by someone knowing the private key. An eavesdropper has to solve a hard math problem to figure out the private key, here the factorization of maybe a 155-digit integer.

"There is tremendous interest in this in industry," says Boston. The National Science Foundation has given Boston a grant of \$550,000 for the center. Motorola has also awarded him a grant. The ICCIP is collaborating with researchers at three

other cryptography centers located in Waterloo, Canada; Essen, Germany; and Paris, France. Among the challenges the cryptography center is involved with are developing alternative cryptosystems for small devices because safe RSA key lengths are now too long for this, and watermarking schemes to provide copyright protection for digital video and audio.

Boston was born and educated in northern England where he attended Manchester Grammar School. In 1979 he was selected to represent Britain in the International Mathematics Olympiad which is open to mathematicians who are 18 years old or younger. He attended Cambridge University and Trinity College where he studied group theory with John Thompson. Although mathematicians at Cambridge urged him to stay there for graduate work, he wanted to see the world and moved to the U.S. to attend Harvard where he studied number theory with Barry Mazur.

After being awarded his Ph.D. in 1987 at Harvard, he spent 1987–1988, "a good year" he says, at the IHES in Paris where a lot was happening in his field. From 1988–1990 he was a Morrey Assistant Professor at the University of California at Berkeley. He joined the UIUC Department of Mathematics in 1990.

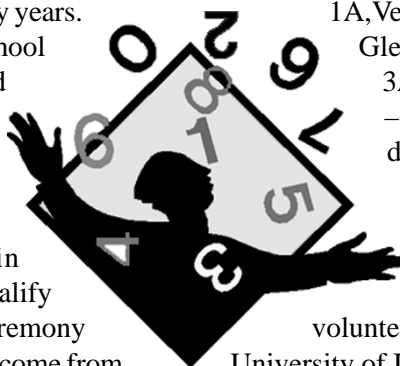
This is the second in a series of articles planned for the Math Times that will highlight the activities of current faculty in the department.

UIUC Department of Mathematics hosts ICTM state finals

The Department of Mathematics is the new host of the Illinois Council of Teachers of Mathematics (ICTM) State Finals. The contest took place at Illinois State University for the past twenty years.

On April 28, 2001, over 2000 high school students from all around Illinois traveled to the University of Illinois at Urbana-Champaign to spend a sunny spring Saturday doing mathematics at the 21st annual contest.

Teams of students participated in regional competitions in February to qualify for the state finals. After an opening ceremony in Foellinger Auditorium, including a welcome from Provost Herman, participants fanned out across the main quad for a variety of mathematical competitions. In addition to individual written competitions, students faced off in oral competitions in front of faculty and graduate student judges and in team events in which they pooled their efforts to solve mathematical problems accurately and quickly.



Trophies and plaques were awarded to top teams and individuals at the end of the day. Congratulations to first place overall teams: Oblong High School – Division

1A, Vernon Hills High School – Division 2A, Glenbrook North High School – Division 3AA, and Naperville North High School – Division 4AA. Wolfram Research Inc. donated copies of the mathematical software *Mathematica for Students* to individual first place winners at the senior level.

The contest was staffed by hundreds of volunteers, including high school teachers and University of Illinois faculty, staff and students. It was wonderful to see so many math majors and former contest participants enthusiastically helping out with this year's contest.

For more information about the contest or to volunteer for the 2002 contest, visit www.math.uiuc.edu/ictm or contact Karen Mortensen at kmortens@uiuc.edu or call (217)244-4128.

Department of Mathematics
University of Illinois at Urbana-Champaign
273 Altgeld Hall (MC-382)
1409 W. Green Street
Urbana, IL 61801

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