ContinuUM

Newsletter of the Department of Mathematics at the University of Michigan Summer 2002

Department Hosts the Gehring Special Year in Complex Analysis

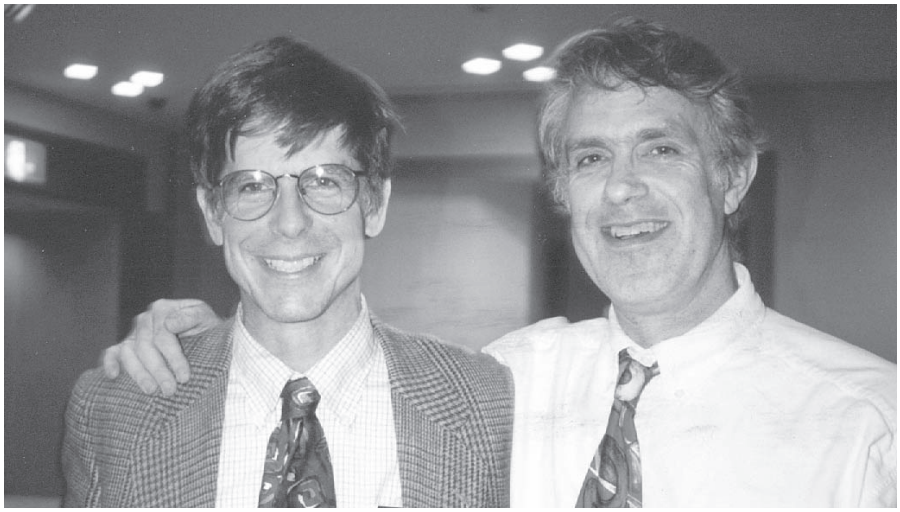
The Department of Mathematics celebrated the Fred and Lois Gehring Special Year in Complex Analysis during the 2001-02 academic year. Supported through the Gehring Chair endowment, the Special Year provided an opportunity to invite several distinguished visitors to the department and host two conferences.

John Erik Fornæss, the Frederick W. Gehring Collegiate Professor of Mathematics, organized the special year and the conferences in the department. "This special year allowed us to really focus our research efforts and collaborate with some exciting visitors," says Fornæss. "I hope that this provided a great opportunity for the department members, especially the younger faculty and graduate students in the field, for real scholarly interaction with some of the most innovative researchers in complex analysis."

The two special conferences held this year contributed to the scholarly pursuits of department members and visitors. In October 2001 the complex analysis conference attracted more than 100 mathematicians. This three and a half day event consisted of over 35 research presentations by mathematicians from around the world, and included a banquet honoring Fred and Lois Gehring on Saturday night.

A second conference, held in March 2002, concentrated on complex dynamics. This smaller conference was filled with exciting research and interaction among the visiting mathematicians and UM faculty and students.

Three mathematicians held Gehring Visiting Professorships during the year. **Pekka Koskela**, from the University of Jyväskylä, Finland, was in the department for the full academic year. Koskela is a well-known expert in complex analysis. **Klas Diederich**, from the University of Wuppertal, Germany, was a Gehring Visiting Professor in the fall. Diederich is a frequent visitor to the department and is a leading researcher in several complex variables. **Eric Bedford**, from Indiana University, held a Gehring Visiting Professorship in the winter term. Bedford received his PhD from UM in 1974, under the direction of **Al Taylor**, and is known for his ground-breaking research in several complex variables and complex dynamics.



Gehring Visiting Professor Eric Bedford and Special Year organizer John Erik Fornæss. Math Department photo.

Other Gehring Special Year Long-Term Visitors

Stephen Buckley – National University of Ireland
Jeffrey Diller – University of Notre Dame
Chiara De Fabritiis – University of Ancona, Italy
Constanze Eppel – University of Wuppertal, Germany
Gerd Fischer – University of Wuppertal, Germany
Josip Globevnik – University of Ljubljana, Slovenia
Kari Hag - Norwegian University of Science and Technology, Trondheim, Norway
Per Hag - Norwegian University of Science and Technology, Trondheim, Norway
Piotr Hajlasz – University of Warsaw, Poland
Jose Llorente – Autonomous University of Madrid, Spain
Kazutoshi Maegawa – University of Kyoto, Japan
Nils Ovrelid – University of Oslo, Norway
Pietro Poggi-Corradini – Kansas State University
Anca Popa-Fischer - University of Wuppertal, Germany
Yurii Reshetnyak - Institute of Mathematics, Novosibirsk, Russia
Ritva Hurri Syrjanen – University of Helsinki, Finland

Notes from Chair Alejandro Uribe

In many ways this has been a transitional year for the department. The first year after **Al Taylor's** experienced and dedicated leadership, we moved into a "bottom line" budgeting system that gives the department more control, and more responsibility, over expenditures. The events of 9/11 and the departure of much of the leadership of the University's administration introduced additional uncertainty this year. I had much to learn as a first-time interim chair, but thanks to the dedication and support of the associate chairs, the executive and personnel committees, and Al's frequent advice, the department navigated through these administrative changes fairly smoothly.

The department hosted what I believe must be a record number of conferences. We had two conferences associated with the special year in complex variables, organized by **John Erik Fornæss** and supported primarily by the returns from the Gehring endowment. The department also hosted a regional AMS meeting in March 2002, which attracted about 350 mathematicians, and the Great Lakes Geometry Conference organized locally by **Dan Burns**. Adding to this the usual amount of seminars and colloquia, the level of research activities in the department was extraordinary. Many of our faculty received significant awards and honors, some of which are highlighted in this issue of *ContinuUM*. The chair has a particularly good view of the level of accomplishments of the faculty, and the vista is truly impressive.

It is not the role of an interim chair to set long-term policies, so I concentrated on short-term goals. Much effort went into recruiting, both faculty and graduate students. Under the leadership of **Toby Stafford**, the personnel committee considered many candidates for faculty positions. I confirmed that, as **Trevor Wooley** pointed out in his column here last year, it is very difficult to compete against the top 8 departments in the country; several of our offers were turned down. I am pleased to announce, however, that we have recruited three outstanding young mathematicians. **Stephen DeBacker**, who works in *p*-adic representation theory, accepted an associate professorship. **Jinho Baik**, an expert in Riemann-Hilbert problems and completely integrable systems, and **Patrick Nelson**, who works in mathematical biology and is already here, accepted tenure-track assistant professorships.

Graduate student recruiting went very well this year. Thanks to the financial flexibility of the new budget, we were able to make better offers to prospective graduate students, which resulted in an incoming class of 32 students, 13 of whom are women.

There are significant ongoing changes in the leadership of the very important introductory program. **Mort Brown** stepped down as director of the program this year, a position now filled by **Pat Shure**, and **Bob Megginson** is on leave at the Mathematical Science Research Institute in Berkeley, Cal., where he will be deputy director for the next two years. It is imperative that the department continues to support this program by finding strong leaders. Recruiting efforts in this direction were not successful at the college level this year, which led to an intense dialogue between the department, the dean and the LSA executive committee. I think the result is very positive: We now have official recognition from the college of our need for a tenured leadership position for the introductory program, with specific criteria for tenure. I believe this is a solid basis on which the department can recruit outstanding faculty for this role.

Being chair has been an extraordinary, often exciting, experience, well described by Jefferson's phrase *splendid misery.* As I step down after two years of administrative service, first as associate chair and then as interim chair, I find the department healthy and strong and I look forward to the quiet of academic work. I am also very grateful to all who worked so hard in service roles to make this transitional year go smoothly. It has been said that the strength of a department resides in its faculty, and I know this faculty will support **Trevor Wooley** to lead the department to new heights.

- Alejandro Uribe

Celebrating Martin Luther King Day

The third annual Marjorie Lee Brown Colloquium was held in conjunction with the University's Martin Luther King Day observance (see item on page 3). Pictured are colloquium coordinator Professor Karen Smith, speaker Dr. Raymond Johnson, Chair Alejandro Uribe and Professor Bob Megginson. Math Department photo.

Record Number of Events and Conferences

During the 2001-02 academic year, seemingly every month there was a different special event or lecture series held in the department. While the Special Year accounted for some of the excitement (see page 1), other events drew many visitors here. A chronological listing of the major events and conferences this year follows.

Ziwet Lectures

In October, Professor **Timothy Gowers** from Cambridge University and Princeton presented the Ziwet Lectures. His talks, entitled "Szemeredi's Theorem and Related Results" examined the theorem that states that every set of integers of positive upper density contains arbitrarily long arithmetic progressions. Gowers presented his new, more quantitative approach to the solution of this theorem. The Ziwet lectures were established through a bequest by Alexander Ziwet, a professor in the UM Department of Mathematics from 1888-1925.

Mathematics Career Day

In November, mathematics undergraduates had the opportunity to meet with alumni/ae representing a variety of career options. Ten alums working in insurance, financial, industrial, business and educational concerns took the time to come to Ann Arbor and share career information with undergraduate math majors. About 100 students took advantage of this opportunity to explore available career paths in which to utilize their mathematics degrees.

Inaugural Collegiate Chair Lecture

Professor **Philip Hanlon** presented the inaugural lecture of the Donald J. Lewis Collegiate Professorship in Mathematics. The professorship is named for Professor Emeritus **Donald J. Lewis**, who served on the mathematics faculty for over 40 years. His research lies in an area of number theory concerned with Diophantine problems and encompasses the theory of algebraic number fields and function fields, and arithmetic geometry. During Lewis' ten years as chair, the department developed a national reputation as a leader in innovative undergraduate education, the department's research rankings rose into the top ten, and an interdisciplinary initiative was introduced.

Hanlon's lecture to inaugurate his collegiate chair was entitled "New Frontiers in Applied Mathematics." The lecture discussed "discrete math," a kind of mathematical problem that arises particularly in applications to the information sciences. As a specific application, he demonstrated the mathematical structure of riffle shuffling, the process most commonly used to shuffle a deck of playing cards. Hanlon discussed how riffle shuffling can be modelled as a Markov (random) process. A fundamental result is that within this model, the probability of achieving a given ordering of the cards after k riffle shuffles depends only on the number of rising sequences in that ordering, i.e., the number of times you have to loop back to the start of the deck when you trace the cards from smallest to largest. Using that fact, it is possible to determine how many riffle shuffles are needed so that there is nearly equal probability of being at any ordering of the cards.

2001 Rainich Lectures

Professor **Martin Nowak**, the head of the Theoretical Biology Program at the Institute for Advanced Studies at Princeton delivered the G. Y. Rainich Lectures. Nowak is a mathematical biologist. His three lectures on distinct topics were entitled:

- Computational and Evolutional Aspects of Language
- Chromosomal Instability of Human Cancers
- A (personal and incomplete) Perspective of Mathematical Biology in Five Equations and Some Stories of Viruses

The Rainich Lectures were established through a gift from Professor Emeritus Raymond Wilder and his wife Una, to honor Yuri Rainich, UM mathematics faculty member from 1926-1956.

Marjorie Lee Browne Colloquium

This colloquium is the department's observance of Martin Luther King Day. The speaker this year was Professor **Raymond L. Johnson** from the University of Maryland. Johnson's research is in the area of harmonic analysis and weighted inequalities. He served as chair of the Maryland Mathematics Department from 1991-1996.

Johnson's talk "The Maryland Experience: a community of African American graduate students" described the process that led to the recruitment and graduation of a significant number of African American mathematics doctorates from the University of Maryland. Johnson related his role in establishing a network of students across disciplines, and the challenges he faced from internal and external influences.

2002 Rainich Lectures

Another set of Rainich Lectures took place in February, 2002. Professor **Robert MacPherson** from the Institute for Advanced Study in Princeton presented a series of three lectures entitled "Combinatorial Description of Topological Spaces." The talks concerned a few modern aspects of an old idea: to present a topological space through combinatorial data. The two recent developments in the area that he highlighted were "combinatorial differential manifolds" and "moment graphs."

AMS Sectional Meeting

The department was honored to have been chosen to host one of the sectional meetings of the American Mathematical Society. This event drew over 350 participants to Ann Arbor! The three day event consisted of hundreds of presentations on a wide variety of mathematical topics. In conjunction with the meeting, special sessions were organized and presented. A special conference on "Curves and Their Moduli," organized by UM faculty, was presented prior to and during the AMS meeting.

Although the weather was gray, AMS organizers and attendees alike had high praise for the department's hosting of the event. The mathematicians were impressed by the depth of research occurring here, as well as the opportunity for exposure to other disciplines via seminars and lectures.

Great Lakes Geometry Conference

The department was host to the 4th annual Great Lakes Geometry Conference. This meeting circulates among the math departments in Madison, Evanston, East Lansing and Ann Arbor. This year's meeting followed directly after a closely related month-long workshop in the UM Physics Department's new Michigan Center for Theoretical Physics, on "The Math and Physics of Extra Dimensions." Several of the GLGC talks bore on related geometrical issues. The speakers were **Ron Donagi** (Penn), **Robin Graham** (U. of Washington), our own **Bruce Kleiner** (who returned from leave at NYU for the meeting), **Jack Morava** (Johns Hopkins), **Rahul Pandharipande** (Princeton), and **Zoltán Szabó** (Princeton,

Continued on page 5

New Faculty Appointments

Mario Bonk, Professor

Bonk attended the Technical University of Braunschweig where he received his Master's in mathematics and theoretical physics in 1986, Doctorate in mathematics in 1988, and Habilitation in 1992.

He began his teaching career as a lecturer at the Technical University of Braunschweig from 1989 to 1996. He held a postdoctoral appointment at UM from 1993 to 1995, and was supported by a Feodor Lynen Fellowship from the von Humboldt Foundation. In 1997 he received the Heisenberg Fellowship, a very prestigious five-year award from the German Science Foundation.

Bonk is an innovative analyst of notable breadth and depth working in a variety of areas including classical complex analysis, quasiregular mappings, and "Gromov-style" geometric analysis on metric spaces. He has made his mark on a number of long-standing problems in geometric function theory, including solving a 70-year old problem in classical complex analysis. He is also actively studying the interplay of analysis and geometry on metric spaces.

Mattias Jonsson, Assistant Professor

Jonsson received his BS in mathematics from the University of Gothenburg, and his PhD from the Royal Institute of Technology in Sweden. He completed a three-year postdoctoral assignment at UM, and now has a tenure track appointment in the department's Program in Actuarial and Financial Mathematics.

Jonsson's current research interests are in the areas of dynamical systems, financial mathematics, complex analysis and ergodic theory. His research in higher-dimensional complex dynamics involves the ergodic properties of iterates of holomorphic maps of complex manifolds, in particular complex projective space $\mathbf{P}^k$. Jonsson has worked on joint projects in this area with colleagues at Notre Dame, Penn State, and in Paris. In the area of financial mathematics, he is studying optimal trading strategies and other stochastic control problems.

Kristen Moore, Assistant Professor

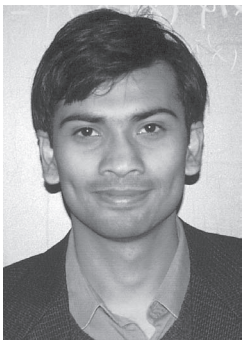
After receiving her BS in mathematics from Bucknell University, Moore became a practicing actuary, and achieved associate status in the Society of Actuaries. Her 1999 PhD thesis from the University of Connecticut, and some subsequent research, studies boundary value problems for nonlinear wave equations and nonlinearly coupled beam and wave equations that govern the torsional and vertical motion of a suspension bridge, in particular, the famous Tacoma Narrows bridge.

Moore joined the UM faculty in 1999 as a three-year assistant professor. She now has a tenure track appointment in the department's Program in Actuarial and Financial Mathematics.

In 2001 Moore was awarded an American Fellowship from the American Association of University Women. The award recognizes only 18 fellows within all of the arts, humanities, social sciences, and natural sciences. Moore spent the 2001-02 academic year at the University of Wisconsin.

Kannan Soundararajan, Associate Professor

Soundararajan received his BS in mathematics from UM in 1995. From his first days here, it was evident that he was a remarkable talent. He was publishing serious mathematics papers during his undergraduate career. He received numerous awards while attending UM, including the very first Morgan prize, given jointly by the American Mathematical Society, the Mathematics Association of America, and the Society for Industrial and Applied Mathematics, recognizing the best research in mathematics by a North American undergraduate.

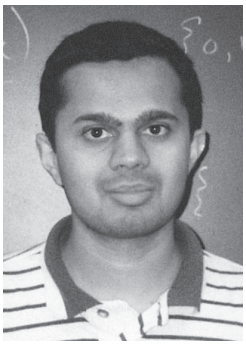


In 1998, Soundararajan received his PhD from Princeton University. Since then he has held a five year fellowship from the American Institute of Mathematics.

Soundararajan is an outstanding young mathematician working in the areas of analytic number theory concerning the L-functions and multiplicative number theory. His work interacts with recent developments in the analytic theory of automorphic forms and the Katz-Sarnak theory of symmetry groups associated with families of L-functions.

Divakar Viswanath, Assistant Professor

Viswanath received his BS in computer science from the Indian Institute of Technology in 1992, and received his PhD in computer science from Cornell University in 1998. He held postdoctoral positions at the Mathematical Sciences Research Institute and the University of Chicago.



Viswanath is a strong mathematician and an impressive scholar working in the area of numerical analysis. While foremost an analyst, he has very broad cross-disciplinary interests which include dynamical systems, theory of random matrices, probability, and numerical analysis of differential equations.

Math Problem

What is the smallest positive integer k such that the sum of the decimal digits of $k(10^{2002} - 1)$ is not equal to 18018?

This problem was taken from this year's Undergraduate Mathematics Competition. The answer is elsewhere in this newsletter.

New Three-Year Faculty

New assistant professors are listed here with their doctoral institutions and area of speciality. Hildebrandt and VIGRE appointments are also indicated.

Michael Bolt - University of Chicago, Several Complex Variables (VIGRE)

Paul Hacking - University of Cambridge, Algebraic Geometry (Hildebrandt)

Patricia Hersh - Massachusetts Institute of Technology, Combinatorics (NSF Post-Doc)

Richard Horja - Duke University, Algebraic Geometry

Benjamin Joseph - Massachusetts Institute of Technology, Combinatorics (NSF Post-Doc)

William Mann -Harvard University, Algebraic Number Theory (NSF Post-Doc)

Michael Roitman - Yale University, Vertex Algebras and Lie Algebras

David Schneider - University of Washington, Mechanical Systems (VIGRE)

Events, continued from page 3

formerly UM). Titles and abstracts of their talks are available at http://www.math.lsa.umich.edu/seminars/glgc.html.

MMSS Summer Program

The Michigan Math and Science Scholars program was again a huge success. Taking place during the month of July 2002, 169 high school students participated in the program. Besides several courses in mathematics, campers could choose from curricula in biology, chemistry, physics, and statistics. New courses this year included "Explorations of a Field Biologist" in biology; "The Physics of Magic and the Magic of Physics" in physics; and "Sampling, Surveys, Monte Carlo and Inference" in statistics. Each course has both a classroom component and laboratory session with hands-on activities. For example, students in the geometry class constructed an 8-foot tall icosahedron in the mathematics atrium that remains on display. Extracurricular activities included a trip to Cedar Point amusement park, the Ann Arbor Summer Festival and Art Fairs, game nights, nature hikes, and other outings. For information on this program and future programs, visit www.math.lsa.umich.edu/mmss/.

Faculty Kudos

Brian Conrad received the highest award bestowed by the United States Government on a young scientist: The Presidential Early Career Award for Scientists and Engineers. Each year the NSF selects nominees for PECASE from among the most meritorious new CAREER awardees. The PECASE program recognizes outstanding scientists and engineers who, early in their careers, show exceptional potential for leadership at the frontiers of knowledge.

Charlie Doering was elected a Fellow of the American Physical Society in recognition of his fundamental contributions to the analysis of noisy and nonlinear dynamical systems. Election to fellowship in the APS is limited to no more than one half of one percent of its membership.

Curtis Huntington was awarded the Society of Actuaries' 2001 John E. O'Connor Jr. Distinguished Service Award. The award recognizes "his important contributions to the advancement of the actuarial profession throughout the length of his career, devotion to others in employing unique and important professional skills in the public interest, and selfless commitment of time, energy and effort to these causes and goals, which reflect the highest humanitarian standards and beliefs of the actuarial profession."

Bob Megginson will be the deputy director of the Mathematical Sciences Research Institute in Berkeley, Cal. from July 2002 through July 2004. Megginson was also selected for inclusion in the book "*100 Native Americans Who Shaped American History*" by Bonnie Juettner.

Peter Miller has been selected as an Alfred P. Sloan Research Fellow. This is an extraordinarily competitive award with fellows selected from the very best scientists of their generation. Miller will continue his work in the area of asymptotic and perturbative methods for integrable nonlinear equations and applications to problems of nonlinear propagation.

Patrick Nelson was awarded a "Career Award at the Scientific Interface" from the Burroughs Wellcome Fund. The awards are intended to foster the early career development of researchers with backgounds in the physical/computational sciences whose work addresses biological questions. Nelson's project, "A theoretical study of HIV-1 pathogenesis: from primary infection, through latency, to effective drug therapy or progression to AIDS," focuses on the development and analysis of mathematical models that are fitted to patient data to understand the infection process.

Pat Shure has been appointed as a senior lecturer by the College of Literature, Science and the Arts, in recognition of her superlative teaching and contributions to curriculum development. This is the highest honor the college confers on a lecturer.

Chris Skinner has been awarded a Packard Fellowship for Science and Engineering from the David and Lucille Packard Foundation. This very prestigious and highly competitive award is given to 24 scientists each year, nominated by 50 selected universities. The fellowship is designed to allow the nation's most promising young professors the support to pursue their science and engineering research with few funding restrictions. The further intent of the foundation is to emphasize support for innovative individual research that involves the fellows, their students and junior colleagues. Skinner will use the fellowship to continue and expand his work in the area of number theory emerging from the links between Galois representations, modular forms, and abelian varieties.

Karen Smith will spend the 2002-03 academic year at the Mathematical Sciences Research Institute in Berkeley, Cal., where she will be an organizer for a special year in commutative algebra. Smith also published a book this year entitled "*An Invitation to Algebraic Geometry*" (Springer) that has been translated into Finnish and is in the process of being translated into Persian. In the March issue of Corp! Magazine, Smith was recognized as one of the 95 most influential women in Michigan.

The following junior faculty have received funding for summer 2002 through the Rackham Faculty Grants and/or Fellowships for Research and Other Creative Activities Program:

Paul Hacking
Hans Johnston
Benjamin Richert
Michael Roitman
Divakar Viswanath

Faculty Profile

Professor Robert Krasny

Robert Krasny joined the UM Department of Mathematics in 1987 as an assistant professor and was promoted to professor in 1996. He received his undergraduate degree from the State University of New York at Stonybrook and his PhD in applied mathematics from the University of California at Berkeley in 1983. Before joining UM, he held an NSF postdoctoral fellowship at the Courant Institute at New York University.

Krasny is an applied mathematician working in the field of scientific computing. His goal is to develop accurate and efficient algorithms for computer simulation of physical processes, especially in fluid dynamics and recently also in molecular dynamics.

During his years at UM Krasny has received significant recognition for his work. He was a speaker at the 1990 International Congress of Mathematicians in Kyoto, Japan. He received a Faculty Recognition Award (1991) and an Excellence in Education Award (1996). In recognition of his contributions to undergraduate education, Krasny was named an Arthur F. Thurnau Professor in 2000.

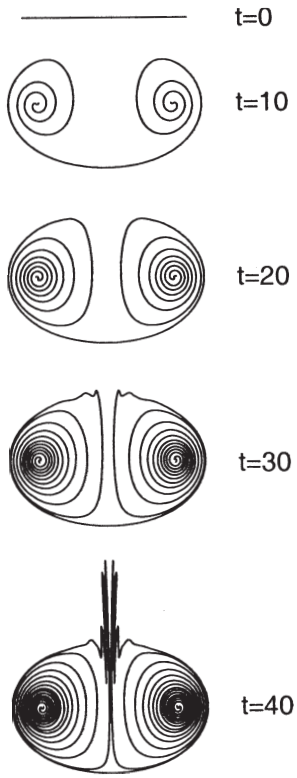
Applied Honors Calculus

In 1994 the College of Engineering asked the Department of Mathematics to offer a new version of calculus for the engineering freshmen who demonstrated strong math ability by their performance on the Advanced Placement calculus exam. The mathematics chair at that time, Don Lewis, arranged for the students to enroll in special sections of Math 186 (Honors Calculus II) and he asked Krasny to supervise these sections. The aim was to provide a balance between theory and applications of calculus, and to cover material the students need for later courses in engineering, math, and science. The sections also attracted enrollment from LSA Honors students, and in 1996 a new course number was created for the project, Math 156 (Applied Honors Calculus II). The course typically enrolls 100-150 students in 4-6 sections.

It proved difficult to find an appropriate text for the course. "Calculus books become more inflated with each new edition—they try to include every conceivable topic," Krasny reports. "I developed my own set of

lecture notes based on experience teaching the course. The material is distributed to the other instructors, and is especially helpful for someone teaching the course for the first time."

While Krasny taught the course for six years, he now serves as course coordinator. He relates that he "loves teaching the course because the students respond well even though the course is demanding. It's satisfying to meet former 156 students who say they liked the course and found it useful in their further studies."



Computer simulation of smoke ring formation; from *"The Onset of Chaos in Vortex Sheet Flow"*, by R. Krasny and M. Nitsche, *Journal of Fluid Mechanics* (2002) 454:47-69.

Life Sciences Grant

In 2001, Krasny received a grant from the Michigan Economic Development Corporation's Life Sciences Corridor Program. This program is utilizing funds the state received from a settlement with the tobacco industry, and is channeling the money into life sciences research in Michigan. The University's new Life Sciences Institute is an integral part of the state's program.

The grant is entitled "Advanced Simulation of Biomolecular Structure and Dynamics." The project involves collaboration with Professor **Sam Krimm** and his colleagues in the UM Biophysics Research Division, as well as contacts with a local software firm interested in commercialization prospects.

With the recent success of the Human Genome Project, attention is now turning to the "protein-folding problem"—understanding how a given protein's amino acid sequence determines the protein's three-dimensional structure. The folded structure determines the protein's biological function, and the relation between sequence, structure and function is the key to potential applications in the pharmaceutical industry. Ultimately it should be possible to design new and more effective drugs for a variety of human diseases.

Protein structure can be determined experimentally by X-ray crystallography, but the process is expensive and time-consuming. The goal of Krasny's project is to develop an alternative method for predicting protein structure by computer simulation. There are two aspects to this: (1) developing a model for the forces acting between the atoms in the amino acid sequence, and (2) developing a numerical algorithm capable of solving the equations of motion for the given forces. In this project Krasny is applying techniques and ideas from his prior work in computational fluid dynamics. The grant provides support for two other mathematics faculty members, **Hans Johnston** and **Divakar Viswanath**, and grant funds have been used to purchase a 16-node parallel computer for use by the group.

"I like this type of interdisciplinary work," says Krasny. "It required an initial investment of time and energy, but receiving the grant was a tangible return. The biophysicists appreciate that mathematicians bring useful skills to the table."

Tom Storer Retires

"From where the sun now stands, I will teach no more forever."

This quote adorned the office door of Professor **Tom Storer** after he taught his last class in mathematics.

Storer was a familiar and friendly face on campus for 35 years. He joined the UM in 1965 after receiving his PhD from the University of Southern California. He was one of the first Native Americans to receive a PhD in mathematics. His research area was primarily in combinatorics, specifically cyclotomy. His monograph "Cyclotomy and Difference Sets" became a standard reference. His wide range of interests included all types of games, string figures, coin collecting, Native American languages, and raising dogs.

Storer is best known and remembered as a superb teacher and counselor, as the balance of this piece will show. For over 30 years he counselled students in the Honors Program. In 1971 he received the Ruth M. Sinclair Memorial Honors Program Award in recognition of his significant contributions to counseling honors sutdents. In recognition of his outstanding skills, he received the Amoco Foundation Good Teaching Award in 1985. He worked closely with the UM and Ann Arbor Native American community. In 1992 he received the "Dreamkeeper Award" from the UM Office of Minority Affairs in recognition of his commitment and dedication in promoting equity and justice for all people of color.

Tom Storer's legacy of teaching and helping students is best described by those who experienced it first hand. Hence, we have asked some of his students to contribute to this piece.

"I can honestly say that I would not be in academia had it not been for Tom Storer. I believe that I took a total of 14 classes from Tom. He was a superb teacher and mentor. Beyond that, Tom was always willing to spend time and really talk with students, whether it was in his office, on the diag playing frisbee, or in the pinball arcade."

- Richard Brazee (BA '79 & MA '83 Mathematics, PhD '87 Natural Resources), Professor of Natural Resources, University of Illinois

"Tom's encouragement, knowledge, wisdom and patience were essential to my completion of the doctoral degree. Besides fostering academic success, those many sessions with Tom (both in traditional settings such as the classroom, and in non-traditional settings such as the Orange Julius) gave me a unique glimpse into the life and genius of this outstanding mathematician. Tom's mentoring and teaching helped me to grow academically and personally. I would not be the professional that I am today had it not been for the nurturing of Tom Storer."

- Curtis Clark (PhD '84), Associate Professor of Mathematics, Morehouse College

"The opportunity to take classes with Tom Storer was among the best things for me about going to UM. Tom inspired in me both a love for theoretical mathematics and, no less important, a confidence in my abilities to learn it. I am still grateful for the astoundingly high level of mathematics that he was willing to teach to first-year undergraduate students like myself. I worked harder for Tom's classes than for any others that I took at UM, but also derived immense satisfaction from them."

- Kyla Ebels Duggan (BA '98 Philosophy), Philosophy PhD student, Harvard

"I was impressed by three strengths of Professor Storer's teaching: He is extraordinarily prepared and organized; he is enthusiastic about mathematics; and he has a genuine interest in his students. It is the third quality which makes him an exceptional teacher. I took two independent study courses from Tom Storer. I do not know whether he received recognition, other than mine, for the hours he spent with me. He is an inspiring and enlightening person to work with. I always feel that he is really interested in my academic progress as a mathematician. He has made a lasting impression on me. Indeed, my feelings toward the University faculty are somewhat shaped by my excellent experience with Professor Storer."

"I wrote the above in 1985 to the chair of the UM Department of Mathmeiatcs. It reflects well my feelings about Professor Storer. As years go by you begin to understand the few true gems of wisdom in education and in mathematics specifically. One of them was told to our combinatorics class by Professor Storer. He said that learning mathematics is like looking at a house from different angles; every perspective offers new knowledge. What a simple and true observation!"

- Martin J. Erickson (BS & MS '85, PhD '87), Professor of Mathematics, Truman College

"My very first class at UM was Tom's Honors Calculus in 1969. I remember wondering what was in store for me at college, what the professors would be like, how I would do, etc. Then Tom walked in wearing mirrored sun glasses, turquoise and silver rings, wrist bands, a black widow spider pendant on a bear-tooth necklace, a dashiki, and jeans. I suspect that every student in that room was shocked, even though we were living through pretty unconventional times. That year Tom's fascinating personality, wardrobe, stories, and jokes, all attracted us to him as a teacher. But his teaching itself was unique. There was a clarity and beauty to his lectures that I found irresistible. Unfortunately, I never experienced it again (on a sustained basis). However, the *feel* of those lectures has always stayed with me and is something I strive to achieve in my own teaching."

"My experience in Tom's courses was probably the single greatest influence on my decision to become a mathematician. Maybe I would have become one anyway. Who knows? But I know that I'm a much better one than I would have been and that my own students are better off because Tom was my teacher. Thank you Tom."

- Steve Gonek (BS '73, MS '76, PhD '79), Professor of Mathematics, University of Rochester

"Professor Storer's classes have an energy that is like running headlong downhill knowing you won't stumble. We were shown the interconnectedness of math, science, and wonder. I particularly remember a frisbee once becoming an example of a theory that occupied my imagination for weeks thereafter. Curiosity and questions were always encouraged and he could coax you into brilliance (indulgently allowed to be thought your own) by pulling on your smallest bit of interest even in something seemingly plain and unrelated to math."

"Tom Storer took a personal interest in his students; you knew it was genuine even if you never had the pleasure of meeting

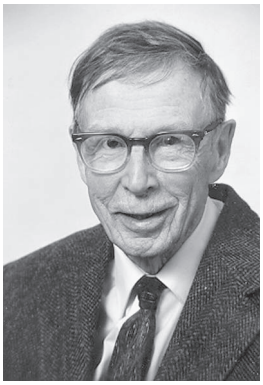
Continued on page 10

Cecit J. Nesbitt

October 1912 — October 2001

This year the department mourned the loss of one of its most esteemed faculty members. **Cecil J. Nesbitt** was born in Fort William (now Thunder Bay), Ontario in 1912. In 1922, he moved with his family to Edmonton, Alberta. While in Edmonton, he met his future wife, Ethel M. Winterburn.

After graduating from Victoria High School, Edmonton, in 1929, Nesbitt worked a year before proceeding to the University of Toronto. He graduated with degrees in mathematics in 1934, 1935, and 1937 (PhD). His PhD thesis was written under Professor Richard Brauer, an outstanding mathematician who was on the UM faculty from 1948-52



Brauer nominated Nesbitt for membership in the Institute for Advanced Study at Princeton for the 1937-38 academic year. At the end of that year, a teaching opportunity developed at the University of Michigan and Nesbitt began his long career here in the Department of Mathematics. At UM, Nesbitt married Ethel in 1938 and had two sons—Norman J. (1939-1957) and Bruce F. (1944-1949). Both sons died from cystic fibrosis, a genetic disease that was little known at that time.

In earlier years, Nesbitt did research with Brauer, T. Nakayama and R. M. Thrall on algebra and representation theory (including 6 papers in the Annals of Mathematics), and is best remembered for the beautiful book "*Rings with Minimum Condition*" (1944), written jointly with E. Artin and R. M. Thrall, describing the basic structure of what are now known as artinian rings. However, Nesbitt's bent had always been to the actuarial field and this showed up in the books "*Mathematics of Compound Interest*" (1971) with Marjorie Butcher and "*Actuarial Mathematics*" (1986) with Bowers, Gerber, Hickman and Jones. The latter text is considered the seminal publication in its field and is used worldwide in educating future actuaries.

Nesbitt was appointed assistant professor in 1941, associate professor in 1946 and professor in 1952. He spent two terms as chair of the Department of Mathematics (1960-61 and 1970-71), and was associate chair from 1962-67. He became professor emeritus in 1980. In 1988, Nesbitt was awarded the Distinguished Faculty Governance Award from Senate Advisory Committee on University Affairs.

Nesbitt became a fellow of the Society of Actuaries in 1946, the same year he became a naturalized U.S. citizen. He was also a founding member of the American Academy of Actuaries in 1965. After completing a 4-year term as director of the Actuarial Education and Research Fund, he continued as the fund's research director from 1980 to 1986. He was vice president of the Society of Actuaries from 1986 to 1987.

He spent time in Puerto Rico and Costa Rica developing pension plans for public employees. In Ann Arbor, Nesbitt served on the city's Retirement Pension Board for 18 years. During his time as advisor, the pension fund grew from $15 million to more than $182 million. He also developed and implemented significant changes in how city workers received their health benefits, and many local officials recognize that, because of Nesbitt's diligent work, the pensions they are receiving are secure.

For 43 active years, Cecil Nesbitt educated generations of actuarial students who went on to become leaders of industry and the actuarial profession. Several current CEOs of major insurance companies, as well as numerous retired chief executives, were among his students. Six of the most recent ten presidents of the Society of Actuaries have been UM actuarial graduates. This is no accident. Graduates of Michigan were guided by a strong faculty, led by Professor Nesbitt, into developing their intellectual capacity to their fullest. Even more importantly, he instilled a strong ethical foundation. From leadership positions, many graduates (following the example set by Nesbitt) made conscious decisions to devote their energies into the further development of the profession.

"There are people out there that say Nesbitt made the most difference in their lives" said **Don Lewis**, professor emeritus and former chairman of the math department. "His students just worshipped him."

Throughout his career, Nesbitt was first, and foremost, a great teacher. "He was the most effective teacher. He could explain abstract concepts so that they were crystal clear. It was also obvious how important his students were to him," said **Curtis E. Huntington**, one of his students in the 1960s and now professor of mathematics and the director of the Actuarial Program at UM.

After retiring from active teaching, Nesbitt continued exploring, mostly with undergraduate students, the theory of an n-year roll-forward reserve financing of large public retirement systems such as the Old-Age Survivors and Disability Insurance (Social Security) program. His most recent published papers have touched on many debatable questions such as adaptive financing and risk theory applications for annuities and insurance products. Nesbitt's hope was "these papers will contribute in the new millennium to a revitalized program at Michigan, and to a new grasp of actuarial science as a basic foundation for annuity and insurance provisions."

"In general, for Cecil, retirement did not lead to a slower pace of activity," reports professor emeritus **Wilfred Kaplan**, "and in recent years I often saw him at his desk in the Math Department."

In 1991, the C. J. Nesbitt Room, a common room for undergraduate concentrators in mathematics funded by alumni/ae, was dedicated. At that dedication ceremony, Nesbitt provided a concise history of actuarial science at UM. Starting in 1903, UM was the first U.S. university to offer such a program. For 63 of these 99 years, Professor Nesbitt was an integral part of the program. Today, the Nesbitt Room is an integral part of the fabric of life in the Department of Mathematics in its home in East Hall.

In 1992, on the occasion of his 80th birthday, a number of UM graduates met in Washington, DC and organized a "surprise" birthday party for Nesbitt. At that party, the start of a campaign to fund the "Cecil J. Nesbitt Chair in Actuarial Mathematics" in the Department of Mathematics was announced. With typical modesty, Nesbitt agreed to have his name associated with the chair, but only if it were made clear that the chair was meant to recognize all of the faculty who had contributed to the past successes of the program. Memorial contributions may be made to this fund.

Phillip S. Jones

February 1912 — June 2002

The department recently lost another of its great educators, Professor **Phil Jones**. Although he began his academic career in the Business School, he received his bachelor's (1933) and master's (1935) degrees in mathematics from UM. After a decade of teaching mathematics at the high school and college level, Jones returned to UM and received a PhD in 1948.

Jones married his wife Helen in 1936 and they had four children—Anne, Phillip Jr., Kristin, and Roger. In 1938 he became a faculty member at the Edison Institute of Technology in Dearborn, Mich., a creation of Henry Ford. Ford was a proponent of hands-on learning, and part of the curriculum at the institute included assembling a Model-T. Jones' background in business provided a suitable hands-on learning activity for girls: He taught them to assemble a balance sheet in bookkeeping courses.

Jones' areas of specialty were mathematics education and the history of mathematics. He joined the UM faculty as an instructor in 1947, and was named professor in 1958. He retired from the faculty in 1982.

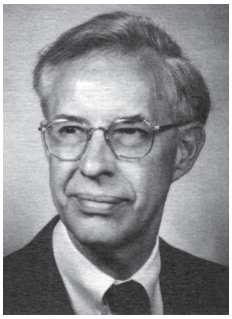
Throughout his career, Jones worked closely with the UM School of Education to further the cause of mathematics education. He was known nationally and internationally as an authority on the history of mathematics and mathematics education and made major contributions to both fields.

"Phil was a member of our department at a time when we prided ourselves on abstract research. He excelled in an area that really didn't fit into that mold. He loved to travel the country and speak to educators about mathematics and teaching."

- George E Hay, Professor Emeritus of Mathematics, UM

Beginning in 1951, Jones organized an annual Mathematics Education Conference held at UM. This conference was attended by mathematics teachers and school administrators from across the state and country, and developed into the largest and most influential conference on mathematics education in the state. The conference was held annually in conjunction with the School of Education for almost 50 years.

"Jones had a deep interest in educating secondary mathematics teachers and supporting them throughout their careers. In the 1950s and 1960s, the department's large and vigorous program in mathematics education, led by Jones, educated a significant proportion of the Michigan math teachers."



- Donald J. Lewis, Professor Emeritus of Mathematics, UM

Jones' professional accomplishments and accolades were numerous. He served as president and vice president of the National Council of Teachers of Mathematics (NCTM) and was a founder of the Michigan Council of Teachers of Mathematics. He was a member of the board of governors of the Mathematical Association of America, and a member of the U.S. Commission on Mathematics Instruction appointed by the National Academy of Science. He was a speaker at the International Congress of Mathematics Education in 1972, and a presenter at the 1975 International Congress of Mathematical Sciences in Pakistan. He received an honorary doctorate from Northern Michigan University in 1972.

One of Jones' major publications was the 1959 NCTM Yearbook, "*The Growth of Mathematical Ideas, K-12*." A main thesis of the book is that students should continually have recurring but varied contacts with the fundamental ideas and process of mathematics—number and operation; relations and functions; proof; measurement and approximation; probability; statistics; language and symbolism of mathematics; and mathematical modes of thought. This view of curriculum has been accepted broadly in elementary and middle schools and has influenced secondary school curricula.

"Phil Jones was willing to tackle new initiatives aimed at improving mathematics education. He was respected and admired by his contemporaries and he leaves a legacy of colleagues and students who carry on his passion for teaching."

- James M. Rubillo, Executive Director, NCTM

"His patience and thoughtfulness for others were among his strengths. His contributions to mathematics education have been very significant—particularly with his interest in the history of math and its relevance to the contemporary world."

- James D. Gates, Executive Director Emeritus, NCTM

While his vision failed later in life, Jones still loved books and reading. He used his Kurzweil reading machine to keep up with research in his field, and enjoyed reading all kinds of literature. Comments from colleagues and former students illustrate how Jones influenced many peoples' careers and lives. He was an outstanding teacher who endeavored to help others teach more effectively. He appreciated that UM graduates provide leadership and service to mathematics education in their role as teacher, mathematics consultant, or college professor.

"It seems to me that each faculty member at Michigan is asked to assemble a three-legged stool, the legs being research, teaching and service. Most of us wobble around on one or sometimes two legs, but Phil's stool had three sturdy legs. Henry Ford would have been pleased."

- Eugene Krause, Professor of Mathematics, UM

"My father was extremely dedicated to the UM and the highest sense of a liberal arts education. He took great pride in his grandchildren's accomplishments and was delighted to see the diversity of their avocations and professions. The eight grand children include a physics teacher, a science writer, a software specialist, a student of Latin American policy, a student of Chinese healing arts, an independent entrepreneur, and a student of mountains and geology."

- Kristin Jones, Daughter

"Phil and I co-taught mathematics and mathematics education classes for teachers. As an enthusiastic and stimulating teacher, it was clear how devoted he was to the subjects and to helping students understand what they were learning. I consider it a great privilege to have worked with Phil as a colleague for 23 years and to have had him as a trusted friend for 45 years."

- Joseph Payne, Professor Emeritus of Education, UM

Memorial contributions can be made to the Jones-Payne-Coxford Award Fund, UM School of Education, 610 East University, Room 1111C, Ann Arbor, MI 48109-1259. The award is given annually to a graduate student in mathematics education.

Three Faculty to Speak at International Congress

The International Congress of Mathematicians, sponsored by the International Mathematical Union, is held every four years. This large and prestigious conference takes place this August in Beijing, China. Three of our faculty members have been asked to speak at this year's conference. Abstracts of their talks follow.

Juha Heinonen

The Branch Set of a Quasiregular Mapping

The issue of branching in quasiregular mapping will be discussed, and in particular the relation between branching and the problem of finding geometric parametrizations for topological manifolds. Other recent progress and open problems of a more function theoretic nature are also presented.

Toby Stafford

Noncommutative Projective Geometry

By analogy with the commutative situation, the category of graded modules modulo torsion over a noncommutative graded ring of quadratic, respectively cubic growth should be thought of as the noncommutative analogue of the category of quasi-coherent sheaves over a projective curve, respectively surface. This intuition has lead to many nontrivial insights and results in noncommutative algebra. Indeed, noncommutative curves and noncommutative graded domains of quadratic growth have been classified. Despite the fact that no classification of noncommutative surfaces is in sight, a rich body of techniques has been developed and this has lead to some remarkable new examples. This survey talk will describe many of the recent developments in this area.

Trevor D. Wooley

Diophantine Methods for Exponential Sums, and Exponential Sums for Diophantine Problems

The Hardy-Littlewood (circle) method provides a fertile arena for the interaction of harmonic analysis involving exponential sums, diophantine problems, and arithmetic geometry. So far as diagonal or potentially diagonal problems are concerned, estimates for mean values of exponential sums are of fundamental significance. This talk will survey recent progress in this area, highlighting the trend towards incorporating less traditional diophantine input within the underlying analytic methods. Three themes will guide the discussion. The first topic is the "efficient differencing" methods for estimating mean values of exponential sums, and especially smooth Weyl sums, in which the summation is over integers whose prime divisors are small.

Many applications of the circle method to additive problems employ, at some vital stage of the associated argument, classical inequalities of Bessel or Cauchy. The second theme of the discussion will describe recent work in which variants of these inequalities are employed that better exploit available diophantine structures. The third theme will explore applications of the circle method that extend beyond those transparently accessible to the above methods. A class of algebraic varieties with small dimension relative to their degree can be successfully analyzed via the circle method, following a descent process. The latter topic forms an emerging area of contact between the circle method and arithmetic geometry.

Solution to Math Problem

The number $10^{2002} - 1$ consists of 2002 9s. The sum of the digits of this number is equal to $9 \cdot 2002 = 18018$. If $k \leq 10^{2002}$ is a positive integer, then the sum of the digits of $10^{2002} - k = (10^{2002} - 1) - (k - 1)$ is $18018 - s$ where s is the sum of the digits of $k - 1$. Therefore the sum of the digits of

$$k(10^{2002} - 1) = (k - 1)10^{2002} + ((10^{2002} - 1) - (k - 1))$$

is equal to $a + 18018 - a = 18018$. The sum of the digits of

$$(10^{2002} + 1)(10^{2002} - 1) = 10^{4004} - 1$$

is equal to 36036 because this number consists of 4004 9s and $9 \cdot 4004 = 36036$. We have shown that $k = 10^{2002} + 1$ is the smallest positive integer k such that the sum of the digits of $k \cdot (10^{2002} - 1)$ is not equal to 36036.

Storer, continued from page 7

him outside the classroom. Anywhere you found him—in his office, on a bench in the sun, at a favorite corner of the Brown Jug—he welcomed every smiling face."

- Susan Kolodziejczyk (BA '93 Anthropology), Senior Researcher, National Geographic Society

"Besides being a brilliant mathematician (which I know he would be too humble to admit), Tom has a BIG heart and took time for students. I deeply appreciated the time he spent with me when I was a student at UM. Tom took a personal interest. We would spend time people watching on the Diag or at the Brown Jug. I remember seeing Tom in his colorful Native American ribbon shirt on campus and it helped me to see a friend. He was successful at preserving his traditional values in a busy and chaotic environment. I admire him for that."

- Brooke Lutz (BS '93 & MS '94 Engineering), Senior Logistics Engineer, Haworth, Inc.

"Tom's enthusiasm for teaching undergraduates, especially freshmen, was obvious even on the first day of class. He believed courses like Math 185 and 186 were opportunities to convince students that math can be elegant and sublime — and fun. Tom introduced me to the beauty of higher mathematics, and for that I will always be grateful."

- BeLinda Mathie, JD (BA '98), Associate in the firm Katten, Muchin, Zavis, Rosenman, Chicago

"Tom Storer was the type of teacher who would forever change anybody who was his student. He once gave an assignment with ten different problems, each from a different area of science, and the answers were all 'The Fibonacci Numbers.' I often use examples and problems of his in my own classes, as do many of his former students. I am a better person for having been Tom's student."

- Doug Shaw (MS '91, PhD '95), Assistant Professor of Mathematics, University of Northern Iowa

Lee Zukowski, a long-time Department of Mathematics staff member who has now retired, established a fund in Tom Storer's name. The fund will provide an annual award to an outstanding mathematics honors student.

Recent PhD Recipients

Morgen Bills completed his dissertation *"On Homomorphisms of Brauer Algebra Modules in the Non-Semisimple Case"* under the direction of Phil Hanlon. He has a position with the National Security Agency.

Manuel Blickle completed his dissertation *"The Intersection Homology D-Module in Finite Characteristic"* under the direction of Karen Smith. He will be a postdoctoral research fellow at the Mathematical Sciences Research Institute in Berkeley for the 2002-2003 academic year, and after that will be a research fellow at the University of Essen, Germany.

Tszho Chan completed his dissertation *"Pair Correlation and Distribution of Prime Numbers"* under the direction of Hugh Montgomery.

Seung-Il Choi completed his dissertation *"Degenerate Principal Series for Exceptional p-adic Groups"* under the direction of Allen Moy.

William Correll, Jr. completed his dissertation *"The Smith Normal Form and Kernel of the Varchenko Matrix"* under the direction of Phil Hanlon. He is employed by Veridian, a high technology company in Ann Arbor.

Daniel Haas completed his dissertation *"A Geometric Study of the Toric Varieties Determined by the Root Systems A_n, B_n and C_n"* under the direction of Michael Roth.

Zair Ibragimov completed his dissertation *"The Apollonian Metric Sets of Constant Width and Mobius Modulus of Ring Domains"* under the direction of Fred Gehring. Zair is the first student from the Republic of Uzbekistan to receive a PhD in the United States. He has a postdoc appointment with the University of Texas.

Marius Irgens completed his dissertation *"Properties of Square Integrable Holomorphic Functions"* under the direction of John Erik Fornæss. He will be a postdoc at the Norwegian University of Science and Technology in Trondheim.

Eduard Kirr completed his dissertation *"Resonances in Hamiltonian Partial Differential Equations"* under the direction of Anthony Bloch and Michael Weinstein. He will be a Dickson Instructor at the University of Chicago.

Stephen Keith completed his dissertation *"A Differentiable Structure for Metric Measure Spaces"* under the direction of Juha Heinonen. He has a postoctoral research position at the National University of Australia in Canberra.

Jean-Francois Lafont completed his dissertation *"Rigidity Results for Singular Metric Spaces"* under the direction of Ralf Spatzier. He will be a postdoc at State University of New York at Binghamton.

Jianfeng Liang completed his dissertation *"Nonlinear Hyperbolic Smoothing at a Focal Point"* under the direction of Jeffrey Rauch. He has a postdoc position at Northwestern University.

Jesse Otero completed his dissertation *"Bounds for the Heat Transport in Turbulent Convection"* under the direction of Charlie Doering. He will be a VIGRE postdoc at Ohio State University.

Daniel Rogalski completed his dissertation *"Examples of Generic Noncommutative Surfaces"* under the direction of Toby Stafford. He will be an NSF postdoctoral fellow for a year at the University of Washington, and then at the Massachusetts Institute of Technology, where he will also hold a Moore Instructorship.

Kevin Rogovin completed his dissertation *"Local Compactness and Closedness of Families of A-Harmonic Functions"* under the direction of Juha Heinonen. He will be a CMCM postdoc in Numerical Analysis at the University of Jyväskylä in Finland.

Jessica Sidman completed her dissertation *"On the Castelnuovo-Mumford Regularity of Subspace Arrangements"* under the direction of Robert Lazarsfeld. Next year she will be an NSF postdoctoral fellow at the University of California, Berkeley. In the fall of 2003 Jessica will start a tenure-track position at Mount Holyoke College.

Tamon Stephen completed his dissertation *"The Distribution of Values in Combinatorial Optimization Problems"* under the direction of Alexander Barvinok. He will be a postdoc at the Institute of for Mathematics and its Applications at the University of Minnesota.

Master of Arts/Science Degree Recipients 2001-02

Saleh Al-Henaki

Bander Al-Mohanna

Justin Altman

Elizabeth Chen

Hui Chen

Sebastien Chivoret

Zhuoshi Fang

Islam Hussein

Mahmoud Hussein

Tara Javidi

Samuel Kadziela

Seth Lacy

Ji-Woong Lee

Xin Li

Ammar Qusaibaty

Some of our recent PhD recipients (l-r): Jesse Otero, Kevin Rogovin, Eduard Kirr, Daniel Rogalski, Zair Ibragimov. (Math Department photo)

Graduate Program News

Minhea Popa received the **Sumner B. Myers Prize** for the best PhD thesis in mathematics for the year 2001. He completed his dissertation under the direction of **Robert Lazarsfeld**. Popa is currently an assistant professor at Harvard. Popa's dissertation *"From Vector Bundles to Abelian Varieties"* studied the geometry moduli space of vector bundles on curves. These questions naturally lead to considering general problems about sheaves and line bundles on Ableian varieties. While these were approached via modern techniques, the emphasis of the thesis is placed on some applications with a classical geometry flavor regarding curves and their Jacobians.

Theron Hitchman received the **Allen Shields Fellowship** this year. His dissertation, under the direction of Ralf Spatzier, studies the local rigidity of hyperbolic rank one lattice actions on tori."

Daniel Rogalski received the **Wirt and Mary Cornwell Award**, recognizing a student who has demonstrated the greatest intellectual curiosity, given the most promise of original study and creative work in math. He has received a Clay Lift-off Grant from the Clay Mathematics Foundation, allowing him to continue his work in Ann Arbor for the summer.

Hui Chen received the **Otto Richter Memorial Prize in Actuarial Science**. He is pursuing a PhD at the University of Chicago Graduate School of Business.

Benjamin Keen received the Computational Science Graduate Fellowship. His advisor is Smadar Karni.

Samuel Payne is a National Science Foundation Graduate Fellow.

Gilberto Simpson and **David Tello** received Rackham Merit Fellowships.

Jianfeng Lian, Jesse Otero and **Daniel Rogalski** received Rackham One-Term Dissertation Fellowships.

Ronald Walker was named a Regents Fellow and **Zacharia Teitler** was named a Regents VIGRE Fellow.

Mihaela Ciupe was named a Mathematics Department Fellow.

Oscar Felgueiras received a Portugese Fellowship.

Aline Andrei was named a A.V. Flint Memorial Scholar.

Krzysztof Klosin and **Krastio Lilov** were named Grabrielle and Sophie Rainich Scholars.

The following students were named **Alice Webber Glover Math Scholars:**

Mahesh Agarwal
Serban Costea
Hai Long Dao
Afsaneh Mehran
Han Peters
Oichi Yuen

The following students were named **Carroll V. Newsome Scholars:**

Sylvia-Pek Chiang
Calin Chindris
Milena Hering
Pulkit Mathur
Paromita Roy

The following students were named **Departmental Scholars:**

Eiji Aoki
Tobias Berger
Hualong Feng
Peng Gao
Julia Gordon
Robert Houck
Paul Jeray
Thiradet Jiarasuksakun
Daniel Jupiter
Bart Kastermans
Christopher Kennedy
Abigail Ochberg
Mihran Papikian
Alan Wilson
Alexander Yong

Learn more about the Department of Mathematics at the University of Michigan. Visit our web site at www.math.lsa.umich.edu

Undergraduate Math Club

Under the direction of Associate Professor **Brian Conrad**, the Undergraduate Math Club gained membership and held regular seminars this year. The club meets every Thursday afternoon in the Nesbitt Undergraduate Common Room. As an extra incentive, pizza and drinks are provided for all students who attend. The audience is a mix of students at all levels from honors calculus up through senior math majors. Average attendance at this year's talks was 15-20. The meetings of the math club contribute to the overall "vertical integration" (re: VIGRE) that the department has been seeking for the past few years.

At each meeting, a member of the faculty or a graduate student presents a 30-35 minute talk on an interesting mathematical problem, application, or idea (or all three!). The selected topic is something that isn't usually seen in the standard curriculum. Some of these topics lead into important concepts in theoretical or applied research, while others explain a clever solution to an interesting problem. Everything is formulated so as to avoid needing technical background beyond calculus, some exposure to methods of proof, and a moderate capacity for abstract thought.

Sometimes the weekly talk is replaced by a panel presentation on some topic of general interest, such as advice on graduate school or an overview of summer opportunities (in research, jobs, and summer educational programs). There are occasional presentations by undergraduates of some of their own research, if it is of suitably general interest. The main goal is to experience the beauty of mathematical ideas, in whatever form they arise, and to have some free pizza at the same time.

"I think the most important aspect of the math club is that it enables undergraduates interested in math to meet others with similar interests and to find out *where it all goes*" says Conrad. "It seems to have also led to an increase in the number of students majoring in math. Although we can't get funding from the University to subsidize the weekly food costs, we're fortunate that the department has some funds which can be used for this purpose. The expense seems well worth it in the long run."

Undergraduate Award Recipients

The department's team for the William Lowell Putnam Mathematics Competition placed 98th out of more that 453 teams participating in the event. This year's team was comprised of **Vivek Shende, Matthew England** and **Chris Battey**. The individual competition included 2954 students from across North America. **Vivek Shende** placed in the top 100 individually, and UM students **Bertrand Guillou, Thomas Dunlap, Robert Easton** and **Anna Maltseva** all placed in the top 500.

Winner of the 18th Annual University of Michigan Undergraduate Mathematics Competition was **Christopher Battey**. Tied for second place were **Thomas Dunlap** and **Vivek Shende**.

The William LeVeque Award in Number Theory was presented to **Jeffrey Allotta**. The award recognizes a student who is at most a junior and excels in the study of number theory.

The following students received **Evelyn O. Bychinsky Awards**, designed to recognize underclassmen who show exceptional promise in mathematics:

Stacey Bittner
Walter Dulany
Jesse Kass
Justin Malestein
Anna Maltseva

The award for **Outstanding Graduating Senior** went to **Robert Easton**.

Ryan Foley received the **Leon P. Zukowski Prize** for outstanding service in the Math Lab.

Outstanding Achievement in Mathematics Awards went to the following seniors:

Stacey Barbosa
Kathryn Boggs
Brian Clarke
Matthew England
Amy Kimball
Michael Mallernee
Sruthi Pinnamaneni
Wesley Rich
Eric Ryckman
Geoffry Svacha
Tadashi Yamada

Margaret S. Huntington Prizes in Actuarial Science were awarded to the following first year students:

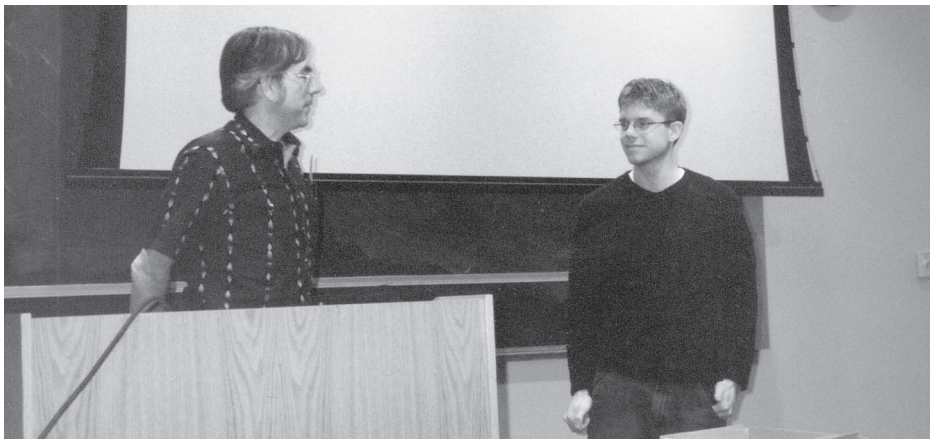
Jason Beyer
Jill Cabay
Rebecca Farmer
Christopher Jones
Erika Palazzolo
Nicha Shastri
Laura Stojan
Meghann Sticker
Caleb Yip

The Irving S. Wolfson Award in Actuarial Science was presented to **Vivek Natarajan**.

Gary Levenbach received the **Otto Richter Memorial Prize in Actuarial Science**.

The CIGNA Award in Actuarial Science was presented to **Ryan Smith** and **Thomas Walker**.

During the summer of 2002, the department funded 27 students participating the the Research Experience for Undergraduates program.



Bob Megginson, Director of the Math Lab, presents the Zukowski prize to Ryan Foley. Math Department photo.

Actuarial Program Highlights

This year proved to be an especially active one for the Michigan Actuarial Program. **Cecil Nesbitt's** passing, noted elsewhere, was a cause for deep reflection, particularly for those of us who had been involved with him and the program in the past. His wise counsel and advice will be sorely missed.

Professor **Kristen Moore**, ASA, formally joined the program last September and will start teaching duties this next academic year. To present classes in Theory of Interest, we recruited **David Kausch** to return to campus as an adjunct professor. To accommodate his schedule, we offered the class on Wednesday evenings from 7 to 10 P.M. and, in spite of some concerns about the timing, had the largest enrollment in recent years.

The student-run program involved a number of activities—educational, social and athletic. While we are not particularly gifted in the area of athletics, we participate with the same great enthusiasm that we do in other areas, and it provides an excellent opportunity for the students to work together.

For the fall, 2002 there will be a meeting of a newly re-constituted Alumni/ae Leadership Council including a periodic review of the program. The review is designed to reflect the evolving syllabus changes from the professional societies as well as the changing needs of the business community.

Finally, planning has started for the annual Actuarial Research Conference (ARC) to be held in Ann Arbor in August 2003. UM asked to host the conference in 2003 in honor of the centenary of the UM Actuarial Program, the first established in the United States in 1903. The ARC will start a number of special celebrations planned for our 100th year of service. These activities will involve both current students as well as alumni/ae and we look forward to seeing many graduates back on campus for some of these events.

- Professor Curtis Huntington

For sisters Kristen (l) and Stacey (r) Barbosa, math runs in the family. Stacey graduated this year, and received an Outstanding Achievement in Mathematics Award. In 2001 she received the Leon P. Zukowski Prize. She plans to teach high school mathematics. Her sister Kristen just finished her sophomore year and declared her math major. (Math Department photo)

When asked why she chose math as a major, Stacey said, "The big factor was a math teacher I had in high school who was amazing. He was so smart and so enthusiastic about teaching, and he really taught me how to think at a whole new level. After that, I knew that I wanted to teach. I could be a math major and have a lot of different jobs, but I was sure that I could be as good of a teacher as he was, and I wanted to try. Throughout college I tutored in the math lab, and that just confirmed my decision."

Kristen chose math as a major because "it has always been something I've enjoyed. I also like the fact that, unlike English or other majors, math is not subjective. There is generally a right or wrong answer to a problem, although there is still the opportunity to be creative as to how one comes to an answer."

Want to get involved with the UM Department of Mathematics? Here are some areas where alumni participation is vital. Let us know if you are interested in working with us on these initiatives.

- Recommend the UM mathematics program to students interested in undergraduate or graduate studies
- Participate in our annual Career Day
- Be a mentor (in person or via email) to a current student
- Set up a recruiting program with your company for graduating students
- Offer internships in your company to mathematics students
- Allow groups of mathematics students to visit your company

Email math.mich@umich.edu or call 734-764-0335

Undergraduate Degree Recipients: December 2001, April 2002, August 2002

Rachael Adamczyk
Khalid Ahmed
Megan Alpert
Aparna Arunkumar
Ilana Bain
Stacey Barbosa
Elvera Baron
Jonathan Barron
Noel Bekrou
Joseph Bernard
Vikram Bhasharan
Meera Bhat
Kathryn Boggs
Ashley Carter
Weiling Chen
Hong Chong
Brian Clarke
Brandi Coates
Claudiu Coltea
James Degenhardt
Kunjal Dharia
Geoffrey Dietrich
Nedialko Dimitrov
Robert Easton
Matthew England
Sarah Ferencz
Ryan Foley
William Foster III
Patrick Franzel
Christopher Gardner
William Gifford
Laura Girling
Gregory Giunto
Bertrand Guillou
Heidi Hinrichs
Stefanie Hobbs
Lisa Hom
Rachael Hopkins
David Howland
Andrew Hsu
Andrew Johnson
Stephen Kazmierski
David Klein
Eric Klein
Vein Kong
Louis Krane
Robert Kugler
Kuan-Chen Lai
Paul Lee
Stacy Lee
Gary Levenbach
Amina Malik
Michael Mallernee
Lindsey Miller
Siwatu Moore
Jessica Nowak
Adegoke Ojewole
Catherine Ong
Margaret Peters
Sruthi Pinnamaneni
Wesley Rich
John Riemer
Eric Ryckman
Jonathan Salett
Nicolas Salvagione
Michael Shapiro
Benjamin Singer
Jodi Siskind
Sara Sivley
David Skalinder
Nicholas Smith
Ryan Smith
Stephen Steffes
Katsuhiko Sueda
Geoffrey Svacha
Natasha Telesford
Ludmilla Teng
Julie Tyrakowski
Jamie Vergari
Melissa Wahl
Troy Wallace
Tyrese West
Stephen Wong
Tadashi Yamada
Derek Young
John Zhu

Alumni/ae Updates

John R. Carnes (BS & MS '48, PhD Philosophy '57) retired from the faculty of the University of Colorado, Boulder, and now lives in the mountains of Colorado. Following receipt of the MS, he was employed in theoretical physics in Oak Ridge, Tennessee, before returning to Ann Arbor to study philosophy. He credits his conversion from math to philosophy to a single course in the foundations of mathematics taught by the legendary Raymond Wilder. Following completion of the PhD he was appointed to the philosophy faculty at Colorado where he served until retirement in 1995. During that time he served as associate dean for the College of Arts and Sciences for seventeen years and held various other administrative positions. His mathematics background combined with his philosophical interests resulting in the production of a book entitled "*Axiomatics and Dogmatics*" (Oxford, 1982), an inquiry into the relations between formal science and dogmatic theology, as well as between factual science and apologetics. Other publications dealt with various aspects of theology as well as moral and political philosophy.

Beauregard Stubbefield (MS '51, PhD '59) received a lifetime achievement award from the National Association of Mathematicians in 2000. His long and varied career included faculty positions at the University of Liberia in Monrovia, Stevens Institute of Technology in New Jersey, Oakland University in Michigan, and Appalachian State University in North Carolina. He served as a research mathematician for the Detroit Arsenal and was mathematician/EEO manager at the U.S. Department of Commerce. He rendered many hours of time to professional organizations, and also was among those who helped establish the National Association of Mathematicians as an international organization.

Simon Benninga (BS '69) received an MS in mathematical economics at Hebrew University in Jerusalem (1972) and a PhD in economics and finance at Tel-Aviv University (1977). He is a professor of finance (and department chair) at Tel-Aviv University. Since the early 80s Simon has spent 6-7 weeks per year as a "permanent visiting faculty" at the Wharton School of the University of Pennsylvania. In the last 10 years he has published 3 books: "*Numerical Techniques in Finance*" (MIT Press, 1989), "*Corporate Finance: A Valuation Approach*" (1997, co-authored with Oded Sarig), and "*Financial Modeling*" (MIT Press, 1st edition 1997, 2nd edition 2000).

Alan Wilde (BS '70, MA '73) is a national affiliate of the American Chemical Society. He is also included in the 2002 edition of Who's Who in the World.

Howard Shaw (MS '71, PhD '75) recently retired from his position as professor of math and computer science at the Western State College of Colorado. He plans to spend the rest of his life hiking in southern Utah.

Scott Price (MS '83) has worked in real estate for the past five years. He makes use of his analytical background to advise buyers and sellers on the market.

Marc Altschull (BS '94) is an actuarial consultant with Tillinghast-Towers Perrin in Atlanta.

Greg Martin (MS '94, PhD '97) is an assistant professor in the Mathematics Department at the University of British Columbia in Canada.

Tracy Payne (PhD '95) is a tenure-track faculty member at Idaho State University in Pocatello.

Memorial Fund Honors Alumna

After a courageous 32-year battle against metastatic breast cancer, **Lois Zook Levy** (BS '59, MS '62) died at home on April 4, 2002. She is survived by her husband Hiram (Chip) Levy, her sons Joshua and Adam, and two grandchildren. To honor her memory, her family has established the Lois Zook Levy Memorial Award fund in the Department of Mathematics. The award will be given annually to an outstanding graduating mathematics student who plans to teach mathematics at the K-12 level.

Lois was a dedicated alumna of UM, who cared deeply about supporting education at all levels. To Lois, education and learning were top priorities. She began her career teaching high school mathematics in Michigan, and then continued to teach when she moved to Massachusetts with her husband in 1964. Shortly thereafter she settled with her family in New Hope, Pennsylvania in Bucks County.

Her family reports that Lois tried to incorporate learning into all aspects of their lives. "My mom was a phenomenal cub scout den mother," recalls her son Adam, now a professor of mathematics at Bowdoin College. "The other boys in our den still recall some of the amazing creative skits and activities she came up with. I remember well growing up with the quadratic formula explained in detail on a poster she made for the wall of our bathroom. Her own mother was a math teacher, and so am I now, so this really is something of a family tradition that she passed along. Moreover, she was extremely fond of the University of Michigan and the time she spent there."

Lois' husband Chip considered various options when establishing the memorial fund at UM. "Lois has such a great love for Michigan, and I wanted to chose an appropriate venue for the memorial tribute. First I looked at the athletic department because Lois was such a big fan, but the need wasn't there. We've participated in the Martha Cook building fund, but that did not seem personal enough. I think that this award is the perfect way to continue Lois' support for mathematics education."

"I think the main point of the memorial fund is to simultaneously honor her love of UM and her love of teaching (and teaching mathematics in particular)," says her son Adam. "It also occurred to our family that students going on to teach do not typically benefit from much financial support, even though their contributions are so important. This fund is a small way to recognize their contributions as well as my mom's."

So far 50 of Lois' friends, family members, and associates have contributed to the fund. When fully endowed, the fund should provide an annual award of about $1500. This award will allow the department to reward promising mathematics students for their demonstrated talent and dedication. By giving the award to students who plan to pursue a career in mathematics education, it emphasizes the importance of developing knowledgeable and capable teachers of mathematics.

Considering a Donation to UM?

If you are contacted by the University of Michigan for a donation, you can earmark your gift to the Department of Mathematics. Simply tell the caller to designate your gift to mathematics or write Mathematics Department on the pledge card you are sent. We greatly appreciate all of your support, and we hope we can count on you to support future fund-raising projects.

Estate Gifts

You can include the Department of Mathematics in your estate plan. Please call us for information on charitable trusts and bequests to the department, or contact:

LSA Development
524 South Main Street
Ann Arbor, MI 48104-2921
734-998-6255

Unless specified otherwise,
all photos by UM Photo Services

Alumni/ae Reply Form

We'd like to hear from you! Please complete and return this form for our alumni/ae files. You may mail it to the address below, fax it to 734-763-0937, or email the information to Math.Mich@umich.edu.

Name_____

University/Degree/Year_____

University/Degree/Year_____

University/Degree/Year_____

Home Address_____

City, State Zip_____

Home Phone_____ Business Phone_____

Firm/Institution_____

Position_____ Email Address_____

☐ **This is a new address**

Information about yourself or comments on the newsletter:

☐ **Check here if you do not want this published in the next ContinuUM**

Department of Mathematics
University of Michigan
525 E. University, 2074 East Hall
Ann Arbor, MI 48109-1109
734-764-0335 • www.math.lsa.umich.edu

NONPROFIT
ORGANIZATION
U.S. POSTAGE
PAID
ANN ARBOR, MICH
PERMIT NO. 144