ContinuUM

Newsletter of the Department of Mathematics at the University of Michigan 2003-2004

Virginia Young Named to Nesbitt Professorship

In 2003 the department welcomed **Virginia (Jenny) Young**, who became the inaugural holder of the Cecil J. and Ethel M. Nesbitt Professorship in Actuarial Mathematics. Young is both a Ph.D. and an FSA and is one of the preeminent actuarial researchers in the world today.

After receiving her Bachelor's in mathematics from Cumberland College, Young entered the graduate program in mathematics at the University of Virginia. She completed her Ph.D. in just three years with a dissertation in algebraic topology. "When I look back, I now realize that my graduate career was too short," says Young. "However, I had an excellent advisor and mentor in Robert Strong." After a two-year postdoctoral fellowship at the Institute for Advanced Study, she worked from 1986-1990 as an assistant and later associate professor of mathematics at Cumberland College in Kentucky.

In 1990, seeking to use her mathematical skills in an area that was more applicable to real life, Young pursued a career in the actuarial field. For three years she worked at the Wausau Insurance Company; during this time she passed all of the examinations to become a Fellow of the Society of Actuaries (FSA). In 1993, Young joined the faculty of the School of Business at the University of Wisconsin, Madison in the Department of Actuarial Science, Risk Management and Insurance. She began as an assistant professor, and was promoted to associate professor in 1999. She has also passed examinations 1-5 of the Casualty Actuarial Society.

During her tenure at Madison she won four different prizes for two papers on the topics of group health underwriting and Social Security actuarial assumptions. In 1999 she was co-winner of the Halmstad Prize for the best paper in actuarial science from the Actuarial Education and Research Fund for the paper *"Forecasting Social Security Actuarial Assumptions"* with Frees, et al. The paper treats statistical estimation of parameters for a linear model that predicts future Social Security liabilities of the federal government. The authors analyze time series data from the historical rate of inflation, returns on treasury notes, the wage rate, and the unemployment rate. This paper is very much related to the work that Cecil Nesbitt did in the area of Social Security.

Young is also deeply interested in the theoretical underpinnings of prediction models. In their joint work *"Equity and Credibility,"* Young and Promislow study the comparative advantages of linear least squares methods of prediction versus the entropy methods which occur in information theory. On the theoretical side the most exciting of her works is the recent collaboration with Zariphopoulou. In this work they are concerned with optimizing portfolios containing cash, hedgeable risky assets like stocks, and non-hedgeable liabilities such as insurance policies. The mathematics involved is the mathematics of stochastic control theory and its associated non-linear partial differential equations. The problems in partial differential equations that occur are exactly solvable in a few remarkable cases, but otherwise require an extensive analysis to even prove a solution exists.

"I am very excited to be in a mathematics department again; it was one of the most attractive aspects of the position," says Young. "I am looking forward to working with the AIM (Applied and Interdisciplinary Mathematics) program, and helping to establish a stronger graduate program presence in financial and actuarial mathematics. I want to contribute to the growth of the actuarial math program here at Michigan, and broaden the scope to include topics in casualty actuarial math. I am also looking forward to continuing my research with others in the department like Kristen Moore."

"For many years we have been seeking to hire a leader for financial/actuarial mathematics with research credentials appropriate to the distinction of the program, as well as expertise and experience in and contact with the profession outside the university," says Chair Trevor Wooley. "We believe that we have found the ideal candidate. The appointment of Jenny Young will ensure the continued health and progress of the undergraduate actuarial program and provide momentum for the development of a fully-functioning master's program."

"We are delighted that Professor Young has joined us as we celebrate 100 years of the Michigan Actuarial Program," says Professor Curtis Huntington, Director of the Actuarial and Financial Mathematics Program. "With her addition to the faculty, we are in a position to aggressively revitalize both the research and graduate student component of our program as we start the second hundred years of offering excellence in actuarial education and research."

"The honor of being the inaugural holder of the Nesbitt Chair is just overwhelming," says Young. "Nesbitt's work is known worldwide, and it will have a lasting impact on the actuarial profession."

View from the Chair's Office

Trevor Wooley

Few sectors of the economy have escaped the unwelcome effects of the economic downturn, and with state budgets being squeezed both by declining tax revenues, and by federal cutbacks, public universities across the nation have experienced the largest budget cuts in two decades. Although the storm clouds had been visible on the horizon for a couple of years, the budgetary hurricane that hit the academic community over the past two years stopped many institutions in their tracks. Here at Michigan, it is with unexpected relief that I report that the Department of Mathematics has, thus far, not only weathered this storm without sacrificing cherished features of our undergraduate and graduate programs, but through hard work and good fortune, achieved measured progress in enhancing the Michigan Mathematics experience.

The long, strange trip through this interesting period began with news of a 6% budget cut and a hiring semi-freeze. The next year saw another budget cut roughly half that magnitude. Given that 90% of our budget is spent on salaries of instructors and support staff, such a cut seemed daunting indeed. Still, with the news that some institutions were experiencing back-to-back funding reductions totaling 30%, we comforted ourselves by noting that it could have been much worse! Indeed we have handled a large part of this cut through more efficient management of our class offerings without untoward consequences for our students. Furthermore, while the College of LSA rationed departments across the college to filling one position each per year, independent of the size of the department, through good fortune and a fair measure of skullduggery, we have circumvented this semi-freeze by filling no fewer than seven permanent faculty positions over the past two years. You will hear more about these new faculty members in this and future editions of ContinuUM.

Our Applied and Interdisciplinary Mathematics program is expanding to fulfill the scope that we envisioned for it a decade ago. Aside from the more traditional elements fitting between Applied Mathematics and Engineering and the Natural Sciences, we have been developing components in Financial Mathematics and Computer Science. In particular, with **Virginia Young** joining us as the first occupant of the Nesbitt Professorship in Actuarial Mathematics, our Actuarial Program will be restored to its position as a national leader (see the article in this issue for more news on Actuarial and Financial Mathematics). Moreover, in Fall of 2004 the Department will welcome **Jeff Lagarias**, **Anna Gilbert** and **Martin Strauss** from AT&T Research Laboratories, and this will provide a substantial boost for our teaching and research activities that bridge mathematics and computer science. A major success for us has been to meet the formidable challenge in this depressed budget climate of making progress on the strength of our traditional core activities, while at the same time developing these new and exciting areas that are so important both in the academic environment and the modern workplace.

Despite our successes in these gloomy times, it is worth reflecting on some hard truths that cannot be ignored if current and future generations of students are to benefit from the opportunities that mathematics offers in such abundance. It is apparent that public education is undergoing a pivotal transition that, unfortunately, seems unlikely to be reversed. As recently as 1988, over half of the University of Michigan general fund revenue came from the State of Michigan. Next year, less than 28% of that revenue will come from the State. The shortfall is made up partly from greater external research funds, but primarily from tuition increases. The challenge of making our outstanding "public" education available to students who, on the one hand, are excited about the opportunities that mathematics has to offer, yet do not have the secure financial backgrounds needed to be confident in being able to continue their studies, is one that has grave implications for the extent to which we as mathematicians will be inclusive as a profession. I know that it would have been absolutely impossible for me to obtain a college education without the significant support that I received at a public institution, and I am appalled that the doors of opportunity seem to be closing for so many hard-working and enthusiastic students who ought to be contributing, as mathematicians, to our future. In this ContinuUM we report on the results of our first Alumni/Alumnae Solicitation for scholarship funds, and happily we were able to help four students this year. As a community of mathematicians, we will need to work hard with such endeavors to provide the support that is increasingly essential for the health of our profession. Part of this work will involve reminding our colleagues who have employed their mathematical training with success in other arenas that this mathematics base requires their help to prosper.

When I first arrived here at Michigan, I well remember the speech delivered by the then Chair of the Department at the start-of-year faculty meeting. It was an awesome and terrifying experience with much talk of belt-tightening, of becoming accustomed to cutbacks, of impoverished futures, and that was all before the most depressing part of the speech. Although I have been tempted to dust off a copy of this speech in recent years, the truth of the matter is that the experience that we offer our students is better than ever, and that our Department offers an exciting environment rivaling any in the nation. So while this may not be *the best of times* for the Department, it is certainly far from *the worst of times*!

See more news of the University of Michigan Department of Mathematics on our website http://math.lsa.umich.edu

Hochster Named Distinguished University Professor

In 2004 Professor **Mel Hochster** was named the Jack E. McLaughlin Distinguished University Professor. The Distinguished University Professorship recognizes Hochster's many outstanding contributions as a scholar, gifted teacher and mentor of students, and generous contributor to the life and mission of the department and the university. The Professorship is named in honor of his colleague, the late Professor Emeritus of Mathematics **Jack E. McLaughlin** (1923-2001). McLaughlin served on the UM Mathematics faculty from 1958-1994. Hochster says he "chose Jack because, besides being a very close colleague and friend, I admired his inspired teaching of undergraduates as well as his courage in dealing with the challenges he faced in life".

Hochster is considered one of the most eminent mathematicians in the world, and is a devoted teacher and mentor of students of every level—from undergraduate through graduate, postdoc, and beyond. He is arguably the best commutative algebraist in the country and perhaps the world. His influence on the field is all-pervasive; he has personally touched the lives of many of the most successful practitioners of commutative algebra.

After graduating from Harvard (B.A.) and Princeton (Ph.D.), Hochster was a faculty member at Minnesota and Purdue before joining UM in 1977. He has been a named Collegiate Professor in Mathematics since 1984. In recognition of his excellence in research he was elected in 1992 to both the American Academy of Arts and Sciences and the National Academy of Sciences. In 2003 he was given the Margaret and Herman Sokol Award from the UM in recognition of his outstanding teaching and mentoring.

Teaching and Mentoring

Hochster has had a profound effect on the quality of education at UM, particularly graduate education. Since 1981, he has served as the official thesis advisor for 26 UM Ph.D.s, plus 3 others at Minnesota. Some students had come to the UM specifically to work with Hochster, while an even larger number of his thesis students have been those who arrived at the UM open minded but unsure of what direction to pursue. Hochster's enthusiasm for mathematics, both in the classroom and in coffee room discussions, is contagious. His magnetic personality draws students to his beautiful mathematics, and then his excellent guidance (and abundance of good ideas for thesis problems) sustains them as they are led deeper into research.

At the undergraduate level, Hochster has helped coach Michigan's prize-winning Putnam Exam team, a mathematical competition for undergraduates. He takes an active interest in the program for math majors, regularly teaching and revising its core courses. And even at the most elementary level, Mel Hochster is an effective and popular teacher who cares about students as individuals: during a recent semester of teaching Math 215, Hochster photographed every single one of his over 100 students so that he could learn and use their names.

During three recent summers, he has been an instructor in the Michigan Math and Science Scholars program, working with talented high school students in a two week intensive program that introduces techniques like recursion and ideas from number theory, using properties of the Fibonacci numbers as a starting point.

Of the 29 Ph.D. theses Hochster has supervised, twelve were written by women. An even greater proportion of his recent postdocs have been women. In a field with so few women at the top levels, this is a truly impressive statistic, and something that Hochster supports fervently. In his lecture for the Sokol award, entitled "WOMEN IN MATHEMATICS: We've come a long way - or have we?" Hochster discussed the situation of women mathematicians and other women scientists, partly from a historical perspective, and partly in terms of problems that exist today. There is overwhelming evidence of gender bias in the evaluation of job candidates and in many other contexts. Even when procedures seem to be objective and fair, studies have shown that gender bias is significant and pervasive. While gender bias may not be conscious, it is held equally by men and women.

Through his work with the STRIDE program (Science & Technology Recruiting to Improve Diversity & Excellence), Hochster has worked with other UM faculty to disseminate information about gender bias, recommend procedures to alleviate bias, and provide guidelines for recruiting and hiring procedures. "We have to make people aware of the problem, particularly the unconscious nature of gender bias" Hochster says, "and make tools and processes available to departments to help address the problem."

Research

Hochster's deep insights have had a profound influence on the study of Cohen-Macaulay rings and modules. The Cohen-Macaulay property is a structural property of commutative rings and their modules that allows one to completely describe the elements of a ring in terms of generators in a unique way. Although technical to an outsider, the Cohen-Macaulay property plays a very important role in the field of commutative algebra, and a vital concept in many related branches of mathematics.

In his most famous theorem, the Hochster-Roberts Theorem, Hochster asserts that certain rings arising in representation theory (specifically, rings of invariants of reductive group actions) are always Cohen-Macaulay. This remarkable and beautiful result is used daily by mathematicians, mostly outside Hochster's own field.

Hochster's more recent research, most of it in collaboration with his former postdoc **Craig Huneke**, has been the introduction and development of the subject of tight closure. Tight closure is a closure operation performed on ideals in commutative rings. Its definition is based on reduction to prime

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2003 & 2004 MLK Day Observances

The 2003 Marjorie Lee Browne Colloquium, the department's event celebrating Martin Luther King Day on January 20, featured **Dr. William Yslas Vélez.** Dr. Velez is a Distinguished Professor of Mathematics at the University of Arizona. His talk, entitled *"The Parakeet is Gasping,"* addressed the small number of minorities, particularly Chicanos, on the mathematics faculties at Ph.D. granting institutions.

Vélez graduated from the University of Arizona in 1968 with a major in mathematics and a minor in physics. In March 1968, he was activated by the U.S. Naval Reserves and sent to the Tonkin Gulf, where he served aboard aircraft carriers for two years. After his Naval service, Vélez began graduate school at the University of Arizona, earning a Master's Degree (1972) and a Doctorate (1975), in mathematics. In 1975, he accepted a position as a Technical Staff member at Sandia Laboratories in Albuquerque, New Mexico, where he worked on problems dealing with the command and control of atomic weapon systems. In July 1977, Vélez accepted a position as Assistant Professor at the University of Arizona, and became a full Professor in 1989. In 1998, Vélez was selected as a University of Arizona Distinguished Professor.

While his research interests have been in number theory and algebra, Vélez has always been interested in the ways that mathematics is applied. He has held positions at various military labs, where he has applied mathematics to solve problems occurring in military communication systems. He worked as a consultant to the Naval Ocean Systems Center in San Diego for four summers and received four patent applications dealing with signal processing for military communication systems. Vélez also published several articles dealing with issues in mathematics education and policy issues.

Vélez was a Program Officer for Algebra and Number Theory at the National Science Foundation from 1992-93. He was President of the Society for the Advancement of Chicanos and Native Americans in Science from 1994-96. In July, 1993 he was awarded the National Science Foundation Director's Equal Opportunity Achievement Award. In 1997, Vélez received a White House President's Award for Excellence in Science, Mathematics and Engineering Mentoring.

In his talk, Vélez addressed the scarcity of minority mathematics faculty at Ph.D. granting institutions. He established a link between math literacy and civil rights, quoting Robert Moses: "In today's world, economic access and citizenship depend on math and science literacy." This literacy provides access to technical careers.

It seems that the mathematical community has not embraced these principles. In 1977, there were seven Chicano research mathematicians at Southwestern Ph.D. granting institutions. No others were hired for 20 years. For U.S. students to survive and flourish in our universities the faculty should reflect the nation's population. Diversity is important, but it does not mean importing mathematicians from other countries. The one dimensional focus of mathematics departments on research has had a detrimental effect on students, particularly minority students. Even with good grades, U.S.-born minority students are ignored during graduate recruiting.

Lasting change comes from institutional change, which can only occur within mathematics departments. The changing role of math in society and the mathematician's place in it should serve as a major impetus to change. Vélez hopes that his work at the University of Arizona in mentoring minority mathematics majors to continue on to successful careers or graduate studies will serve as an example to help increase the visibility of Chicanos and other minorities in mathematics departments nationally.

The 2004 Colloquium featured **Dr. Arlie O. Petters**, Professor of Mathematics and Physics at Duke University. He received a Ph.D. in Mathematics in 1991 from M.I.T. In 1993 Petters became an assistant Professor at Princeton. In 1998 he was recruited to Duke, and he became the first African-American to be tenured in the Mathematics Department at Duke and the first elected to Duke's prestigious Bass Society. In 2003, he also became the first African-American to hold a joint appointment in Math and Physics at Duke.

His career began at Hunter College of the City University of New York, where he was part of an accelerated B.A./M.A. program for exceptional undergraduates. Petters graduated from Hunter in 1986 and was the recipient of many awards in mathematics and physics. In 1999, he was honored by his Alma Mater by being inducted into the Hunter College Hall of Fame.

Petters's research is on gravitational lensing, which deals with how light is distorted by the warping of space and time. He has been a pioneer in establishing gravitational lensing as an area of research in mathematical physics. Petters is the leading author of the book titled "Singularity Theory and Gravitational Lensing," which he co-authored with Harold Levine of Brandeis University and Joachim Wambsganss of Potsdam University in Germany. This book is the first to put gravitational lensing on a rigorous mathematical foundation. He has won an Alfred P. Sloan Research Fellowship and a National Science Foundation Early Career grant award. Petters was recently awarded the first Blackwell-Tapia Prize in Mathematical Science by Cornell University and the Mathematical Sciences Research Institute.

Petters has given back to the African-American community by dedicatedly helping and mentoring many minority students ranging from those in elementary school to the Ph.D. level. He was also Director of the Reginaldo Howard Memorial Scholarship Program, which offers full tuition to Duke's best African-American undergraduates. Petters has consequently received several community-service awards.

Petters' talk, entitled "Reflections on Race: An Academic Journey," detailed his personal experiences being an immigrant from Belize and experiencing life in the United States as a teenager. He related the challenges he faced as he navigated intellectually through higher education. Because of his race, he felt that there were additional pressures placed on him, as well as additional opportunities available to him.

Growing up in Belize, Petters was exposed to an ethnically diverse and rich culture. He was unprepared for some of the biases that he experienced when he came to the United States. He learned to overcome racial encounters to his own benefit. His family encouraged him and never allowed him the opportunity to quit. Petters felt that he had earned the right to be where he was studying what he was, and didn't allow other people to taint his opportunities.

This attitude allowed him to remain positive and energized throughout his academic career. Petters encourages young students to develop a positive attitude, and accept challenges as the opportunity to prove their abilities. Students should be provided the means to explore the sciences and given a chance to learn in a diverse atmosphere that encourages acceptance.

The 2004 Marjorie Lee Browne Colloquium also included a tribute to **Dr. Arthur E. Bragg**, who passed away in 2002. As a member of the UM Mathematics Department, Bragg pursued a doctorate in mathematics from 1950 to 1961, and served in the Army during 1951 and 1952. His academic achievements at the UM were admirable. In a 1963 letter, former department chair George Hay commented "…I must say that I have seldom seen such a fine record in course work. You are to be congratulated on having a most unusual ability in mathematics." Bragg's thesis research was in the area of special functions, and he studied under Professor Earl Rainville. He taught in the Mathematics Department and was recognized as a skilled educator, achieving the prestigious level of junior instructor.

Bragg left UM in 1961 and had an outstanding career in mathematics education. He continued his career at Tuskegee University, and then moved to Virginia State University as an Associate Professor. In 1962 Bragg became Chair of the Department of Mathematics at Delaware State College and served in this capacity until 1989. During this time he gave untiringly of his time, talents and interests to improving the department and enhancing the college academically, physically and financially.

Bragg's military career spanned over 34 years of active and reserve duty in the Army. He retired in 1988 with the rank of Lieutenant Colonel. In recognition of his dedicated service to education and the community, Bragg was awarded an honorary doctorate degree in science from Delaware State College in 1990.

New Center Will Focus on Teaching Mathematics

A new initiative to study methods for teaching mathematics has been undertaken by the University of Michigan. The Center for Proficiency in Teaching Mathematics (CPTM) is a collaboration between the University of Michigan School of Education and the University of Georgia College of Education. It aims to improve the capacity of the system of professional education for teachers of mathematics. Principal investigators for the Center at UM are Professors **Deborah Ball** (Education), **Hyman Bass** (Mathematics), and **Edward A. Silver** (Education). A $10.3 million, five-year grant from the National Science Foundation (NSF) funds the center.

Professor Ball notes that a major problem to which the center will devote its resources is that teachers' mathematics preparation often has been insufficient for the mathematical demands of teaching. The Center brings together mathematicians and mathematics educators to develop a better understanding of what constitutes mathematical knowledge for teaching and how teachers can be helped to develop such knowledge.

The need to better prepare teachers for mathematics teaching is substantial; more than a quarter of all students of mathematics in grades 7-12 have teachers who have neither a major nor a minor in their subject of instruction. At the same time, the human resources for training new mathematics teachers are dwindling. In Ph.D.-granting institutions, more than half the faculty will be eligible for retirement in two years, and nearly 80 percent will be eligible in 10 years, according to the NSF.

Professor of Mathematics **Al Taylor** shared information on the need for such an initiative, and the opportunities the Center will bring to the Department of Mathematics. "Increasing the number and quality of mathematics teachers is a critical problem for the U.S., one that math departments, particularly in public universities, should not fail to address. Indeed, mathematics departments play a crucial role in the mathematical education of teachers by providing almost all the mathematical content courses for them. In our department there are many faculty, postdocs, and graduate students interested in working to improve teacher's knowledge of mathematics for teaching. A role of the Center is to learn how to better prepare mathematics teachers, to focus on the ways of understanding mathematics that are critical for teaching. Most factors that affect mathematics education in the U.S. are far outside our influence. However, for the factors we can influence, such as what goes on in our courses for prospective teachers and communicating how professional mathematicians can contribute to improving mathematics education, we look forward to interacting with researchers from the Center to have the best possible mathematics teacher education program at Michigan."

CPTM will support and investigate a variety of approaches to the education of professionals who teach teachers of mathematics, both pre-service and practicing. These teacher educators include doctoral students in mathematics and mathematics education, post-doctoral fellows seeking to develop specialization in the mathematics education of teachers, practicing mathematics educators, mathematics teacher leaders, local curriculum and professional education specialists as well as mathematicians. Projects to be developed by the Center include study groups and summer institutes. Local partners in these activities include Michigan State University, UM Dearborn, Western Michigan University, and the Oakland Intermediate School District.

CPTM will also work to improve national and international capacity for the education of teachers of mathematics by building connections between the Center and the primary professional organizations whose members teach and work with teachers of mathematics.

The center is part of a $100 million NSF initiative across the country to improve teaching and leadership in mathematics, science and technology. Of the three new centers funded this year, the UM School of Education is a major collaborator on two of them, the CPTM in mathematics education, and the other in science education.

Faculty Kudos

Jinho Baik was awarded an American Mathematical Society Centennial Research Fellowship. The primary selection criterion for the Centennial Fellowship is the excellence of the candidate's research, recognizing only 2-4 scientists each year.

Alexander Barvinok published his book *"A Course in Convexity"* through the American Mathematical Society.

Andreas Blass was the program chair for the 2003 annual meeting of the Association for Symbolic Logic.

Anthony Bloch has been elected a Fellow of the Institute of Electrical and Electronics Engineers. He has been elected on the basis of contributions to nonlinear dynamics and geometric control of physical systems. The IEEE Fellow is one of the most prestigious honors of the IEEE, and is bestowed upon a very limited number of members. The number of IEEE Fellows elected in a year is no more than one-tenth of one percent of the total IEEE voting membership. In addition, Bloch's book *"Nonholonomic Mechanics and Control"* was published by Springer-Verlag this year.

Brian Conrad received from the Rackham Graduate School, a Henry Russel Award for the year 2004. This award is conferred annually to recognize distinguished scholarship or authorship (including creativity in the arts) and conspicuous ability as a teacher.

Harm Derksen has been awarded an NSF CAREER Award for Science and Engineering. The Faculty Early Career Development (CAREER) Program is a highly competitive Foundation-wide activity that offers the National Science Foundation's most prestigious awards for new faculty members. The CAREER program recognizes and supports the early career-development activities of those teacher-scholars who are most likely to become the academic leaders of the 21st century. Derksen was also promoted from Assistant Professor to Associate Professor.

Charlie Doering was elected Vice-Chair of the American Physical Society's (APS) Group on Statistical and Nonlinear Physics (GSNP). The APS-GSNP handles fellowship nominations, conference organization, and general scientific and public and policy outreach issues for the American Physical Society in the areas of modern statistical physics and nonlinear dynamics theory, experiments and applications. The APS-GSNP Vice-Chair position is the start of a four-year appointment that evolves in subsequent years into the duties of the APS-GSNP Chair-Elect, Chair, and Past-Chair. Doering also received a Humboldt Research Award for Senior U.S. Scientists. This award is given to researchers with internationally recognized academic qualifications and honors the academic achievements of the award winner's lifetime. Award winners are invited to carry out research projects of their own choice in Germany in cooperation with colleagues.

Robert Griess, Jr., received the University's Harold R. Johnson Diversity Service Award, recognizing his commitment to the development of a more culturally and ethnically diverse campus community. For 10 years, Griess has led the department's annual effort in the King/Chavez/Parks College Day visitation program. He displays his commitment to diversity through taking personal and direct interest in students from under-represented minorities who enter the mathematics program.

Phil Hanlon has been named the University's Associate Provost for Budgetary and Academic Affairs. Phil had been Associate Dean for Finance and Planning in LSA for the past four years.

Mel Hochster received the 2001-02 Margaret and Herman Sokol Faculty Award in the Sciences. This award, one of the most distinguished awarded by the University, is conferred on a tenured faculty member of the University in the sciences, for contributions to graduate education and research.

Trachette Jackson received five distinguished honors this year, and was promoted from Assistant Professor to Associate Professor. The Alfred P. Sloan Research Fellowship is an extraordinarily competitive award with Fellows selected from the very best scientists of their generation. The 2003 Career Enhancement Fellowship from the Woodrow Wilson National Foundation is intended to "assist talented junior faculty to pursue scholarly research and writing...by providing support for a year's sabbatical." Jackson will use the fellowships to further her research in mathematical modeling in biomathematics, in particular, mathematical models for cancer growth and treatment. She also received one of the University's National Science Foundation (NSF)-funded ADVANCE program Elizabeth Caroline Crosby Research Awards. The award will extend a mathematical model of tumor encapsulation to include certain effects of the interaction among tumor cells, the extracellular matrix and interstitial fluid. In June 2003 Jackson was awarded the Amoco Faculty Teaching Award from the UM. Most recently Jackson was chosen by LSA as the recipient of the Robert D. and Janet E. Neary Faculty Award. This award is intended to support faculty research.

Smadar Karni was promoted from Associate Professor to Professor. She also received one of the University's National Science Foundation (NSF)-funded ADVANCE program Elizabeth Caroline Crosby Research Awards. She will use the award to fund a speaker series and two one-day symposia featuring women in applied and interdisciplinary mathematics.

Bruce Kleiner was promoted from Associate Professor to Professor.

Bob Megginson was selected by the National Association of Mathematicians to present the 2003 Albert Turner Bharucha-Reid Lecture. The talk is given each year at the NAM Faculty Conference on Research and Teaching Excellence. The topic was contributions of Native Americans to mathematics. This talk honors the contributions of the African-American mathematical biologist Albert Turner Bharucha-Reid, whose career accomplishments included serving as Dean of the School of Arts and Sciences at Wayne State University in the 1970s. Megginson was recently named Associate Dean for Undergraduate and Graduate Education in the College of LSA.

Peter Miller was promoted from Assistant Professor to Associate Professor.

Kristen Moore received one of the University's National Science Foundation (NSF)-funded ADVANCE program Elizabeth Caroline Crosby Research Awards. She will use the award to facilitate completion of a research program in actuarial and financial mathematics, and help develop the mathematical tools available to analyze the financial environment. Moore also received an Excellence in Education award from LSA.

Karen Rhea has been awarded an Excellence in Education Award from the College of LSA. This award acknowledges her dedication and special contributions to undergraduate education.

Chris Skinner was promoted from Associate Professor to Professor.

Peter Smereka was promoted from Associate Professor to Professor.

Karen Smith received a Faculty Recognition Award from UM for outstanding contributions as a teacher, scholar and member of the University community.

Joel Smoller was a Rothschild Visiting Professor at the Newton Institute of the University of Cambridge in summer 2003.

Kannan Soundararajan was awarded the 2003 Salem Prize. The Salem Prize is awarded every year to a young mathematician judged to have done outstanding work in the field of interest of Raphael Salem, primarily the theory of Fourier Series.

Divakar Viswanath has been awarded an Alfred P. Sloan Fellowship, an extraordinarily competitive award involving nominations of the very best scientists from around the country.

Sijue Wu was chosen by LSA as the recipient of the Phyllis and William Wolff III Faculty Award. This award was established by the LSA Dean's Office to be used for faculty research support.

These junior faculty received funding for summer 2003 and sumer 2004 through Rackham Faculty Grants and/or Fellowships for Research:

Mahdi Asgari
Lyudmyla Barannyk
Gautam Bharali
David Bortz
Andrew Christlieb
Tommaso de Fernex
Bogdan Ion
Elmas Irmak
Gregory Lyng
Jani Onninen
Nikola Petrov
Bernardo Uribe
Hui Xue

New Junior Faculty

Assistant professors who joined the department during the past and current academic years are listed here with their doctoral institutions and area of specialty.

Emina Alibegovic - Univ. of Utah, Algebraic Topology (Hildebrandt)

Lyudmyla Barannyk - New Jersey Institute of Technology, Fluid Dynamics

Jason Bell - Univ. of California, San Diego, Algebra and Analytic Number Theory

Gautam Bharali - Univ. of Wisconsin, Complex Analysis

David Bortz - North Carolina State Univ., Applied/Mathematical Biology

Elizabeth Burslem - Northwestern Univ., Dynamical Systems

Andrew Christlieb - Univ. of Wisconsin, Numerical Analysis

Tommaso de Fernex - Univ. of Illinois, Algebraic Geometry (Hildebrandt)

David Gammack - Univ. of Surrey, Math Biology

Yevgeny Goncharov - Univ. of Illinois, Numerical Analysis

Alexander Gorodnik - Ohio State Univ., Dynamical Systems

Russell Goward - Univ. of Missouri, Algebraic Geometry (VIGRE)

Peter Hasto - Univ. of Helsinki, Computer Science (Gehring Fellow)

Samuel Hsiao - Cornell Univ., Combinatorics (NSF Fellow)

Bogdan Ion - Princeton Univ., Representation Theory (Hildebrandt)

Elmas Irmak - Michigan State Univ., Topology/Geometry

Hyunsuk Kang - Univ. of Pennsylvania, Complex Analysis

Muthukrishnan Krishnamurthy - Purdue Univ., Number Theory (Hildebrandt)

Gregory Lyng - Indiana Univ., Topology/Geometry

Sergiy Merenkov - Purdue Univ., Complex Analysis

Jani Onninen - Univ. of Jyväskylä, Nonlinear Analysis (Hildebrandt)

Nikola Petrov - Univ. of Texas, Dynamical Systems

David Radnell - Rutgers Univ., Vertex Operator Algebras (Hildebrandt)

Nathan Reading - University of Minnesota, Algebraic Combinatorics

James Rossmanith - University of Washington, Applied/Scientific Computing (VIGRE)

Elizabeth Stanhope - Dartmouth College, Differential Geometry (VIGRE)

Howard Thompson - University of California, Algebraic Geometry

Julianna Tymoczko - Princeton Univ., Group Theory (VIGRE)

Bernardo Uribe - Univ. of Wisconsin, Algebraic Topology

Monica VanDieren - Carnegie Mellon Univ., Logic (Hildebrandt/VIGRE)

Hui Xue - Columbia Univ., Number Theory

Yongwei Yao - Univ. of Kansas, Algebra

David Kausch - Univ. of Michigan, Abstract Algebra/Ring Theory. David joined the department's Actuarial and Financial Mathematics program as an Adjunct Associate Professor.

Math Problem

You are playing a game. Your opponent chooses a polynomial P with non-negative integer coefficients: you don't know what it is. You are allowed to choose an integer a and ask for the value of $P(a)$. You may then choose an integer b and ask for the value of $P(b)$. After that, to win, you must determine what the polynomial is. Is there a foolproof strategy for winning this game?

(Answer elsewhere in the ContinuUM)

New Senior Faculty Members

In addition to **Virginia Young** (see page 1) several new tenured or tenure-track faculty were appointed this year.

Jinho Baik joined the department as an Assistant Professor. He received his Ph.D. from the Courant Institute of Mathematical Sciences at New York University, and has held a Veblen Research Instructorship at Princeton University and the Institute for Advanced Study. Baik is an analyst with a strong component in probability. He has worked on several different kinds of problems, including the structure of random permutations and Young diagrams, percolation, and random walks. The Baik-Deift-Johansson theorem is viewed as a very deep, important result that has impressed people in the area and triggered enormous research activity.

Stephen DeBacker joined the department as an Associate Professor. He received his Ph.D. from the University of Chicago. He was awarded a National Science Foundation Postdoctoral Fellowship from 1998-2001, and held the position of Dickson Instructor at the University of Chicago from 1999-2001. Most recently he was a Peirce Assistant Professor at Harvard.

DeBacker has done outstanding work in *p*-adic representation theory. He is considered the strongest researcher of his generation in this area. He solved a conjecture of Hales-Moy-Prasad on the domain of validity of the Harish-Chandra-Howe local expansion that is considered extremely deep and difficult work. Other major results include a description of the nilpotent orbits of *p*-adic groups and the parametrization of conjugacy classes of maximal unramified tori.

Patrick Nelson, who previously had a three-year appointment in the department, has now become an Assistant Professor. Nelson received his Ph.D. from the University of Washington. He held post-doctoral positions at Duke University and the Institute for Mathematics and its Applications prior to coming to UM. In 2002, he received a Career Award at the Scientific Interface from the Burroughs Wellcome fund.

Nelson's research in mathematical biology uses delay-differential equation models to study infectious disease, mainly HIV/AIDS. His work uses many techniques including asymptotics, stability analysis, parameter estimation, the theory of dynamical systems, and scientific computing, and he is also involved in the development of both theory and numerical algorithms for dealing with delay-differential equations.

Sijue Wu joined the department as a Professor with tenure. She received her Ph.D. from Yale University. Since 1990, she has held positions at the Courant Institute, Northwestern University, University of Iowa, Institute for Advanced Study, University of Maryland, and Harvard University.

Wu is a deep and original researcher working in the areas of partial differential equations, fluid dynamics and harmonic analysis. In 2001, she received both the

Ruth Lyttle Satter Prize in Mathematics and the Morningside Silver Medal in Mathematics. She was an invited speaker at the 2002 International Congress of Mathematicians in Beijing, one of the highest honors for a research mathematician. Wu established herself as a top analyst by making groundbreaking contributions to the study of water waves and of vortex sheets. Her success in these areas is particularly impressive considering that her training was not in fluid dynamics.

Junior Faculty Research Highlight

Assistant Professor **Tibor Beke** was awarded a two-year "incubation" grant under the heading of CARGO (Computational and Algorithmic Representations of Geometric Objects). The sponsors are NSF (National Science Foundation) and DARPA (Defense Advanced Research Projects Agency). The objective is to find coding methods, based in part on topological graph theory, that facilitate fast transmission and creation of digital maps. Beke is partnering with the senior scientist at MetaCarta, Inc., a company that provides services for the intelligence community.

The immediate goal of the program is to provide map-transmitting capabilities for low bandwith hand-held devices. Services like MapQuest and Mapblast on the Internet can be used if there is a good net connection and high-resolution screen, but are not practical for more remote applications.

Beke is involved in the broader context that uses topological graphs to describe not just two-dimensional images (like a road map) but also three-dimensional configurations (like a solid body in space).

Faculty Profile - Associate Professor Brian Conrad

As a child, Associate Professor **Brian Conrad** never considered mathematics as a career. An intensive eight-week summer math program during high school made him realize that math is a "living subject." Conrad says that "math is really about ideas, not formulas. Unfortunately, that's something not so widely known. More students would be interested in math if they understood this."

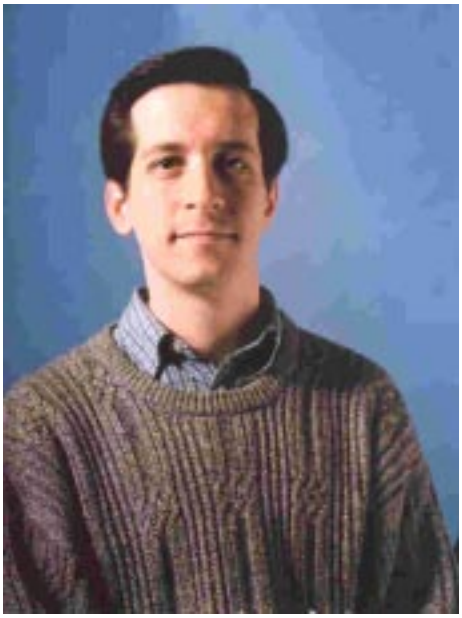
Conrad, who joined the department in 2000 and was promoted to Associate Professor in 2001, is a rising star who works in algebraic geometry and number theory. The overlap of these fields has applications both within theoretical mathematics as well as in development of cryptographic systems needed for secure electronic telecommunications.

A native of Long Island, Conrad is the son of a high school math teacher. His experiences at the summer program convinced him to major in math at Harvard. He earned his Ph.D. in 1996 from Princeton.

Conrad has been widely recognized for his work on the Shimura-Taniyama Conjecture, which concerns properties of elliptic curves over the rational numbers; this work helped to complete a program initiated by Wiles' proof of Fermat's Last Theorem in 1993. His area of general interest, arithmetic geometry, is concerned with the use of geometric structures to investigate problems that arise from number theory. In addition to his work on elliptic curves, he has done work in non-archimedean geometry and the arithmetic of modular curves, and has written a book on duality for schemes. He is presently working on a geometric analogue of an old conjecture on prime numbers, and is completing a book on modular forms.

In July 2002, Conrad was awarded a **Presidential Early Career Award for Scientists and Engineers** in a ceremony at the White House. This award is considered the nation's highest honor for professionals at the outset of their independent research careers, and recognizes the most promising young researchers. In addition, he received a Sloan Foundation award in 2001, and was a Clay Foundation Fellow from 2000-2002.

Conrad's research and leadership potential were evident to the department when he was recruited. His first graduate student, Mihran Papikian, defended his dissertation



in 2003; this thesis work was awarded the Wirt & Mary Cornwell Prize from the department. He is also advising three other graduate students, and is very pleased with the activity of the number theory group in the department. Since coming to Michigan, Conrad has been an outstanding educator and mentor, staying involved in outreach activities at all levels. He was chair of the mathematics honors program, and participated in reorganizing the two-year honors math sequence. "I find that sometimes the honors students want to jump ahead into courses for which they are not really prepared, so I try to help them to see that it is not enough just to know the answers. They need to understand the theory behind the solutions before they move on to more advanced courses."

"As Honors Chair, I met a lot of prospective undergraduates and their parents during campus visits, and the top question the parents always have is: Will getting a math major lead to a decent job? This is of course a most reasonable question, and the parents are often pleasantly surprised when I tell them about the range of job options available to people with strong analytical training, such as in math biology, industry, national security, and finance. The fact that this department offers courses related to all of these fields is a big attraction for students who have an interest in math but also are considering careers in other fields."

Conrad also organized the Undergraduate Math Club. Each week, 15 to 20 math majors meet for pizza and pop in the Nesbitt undergraduate common room and hear a presentation by a faculty member or graduate student on a topic outside of the standard curriculum. "I think the most important aspect of the math club is that it enables undergraduates interested in math to meet others with similar interests," he says. "It seems to have also led to an increase in the number of students majoring in math."

Conrad has given presentations at summer math programs for high school students, and when he first came to UM he gave monthly talks to students at a math and science program at Churchill High School in Livonia, Michigan. He now works individually with students from that program on research projects. "I enjoy working with students at the high school to help them think clearly about mathematical ideas," he says. The student he supervised in 2002-03, Ethan Street, was the only student from Michigan selected as a top 40 finalist in the Intel (formerly Westinghouse) Science Talent Search, and Ethan also won top honors in the International Science and Engineering Fair (first place in math and a trip to the Nobel prize ceremonies in December). In 2003 he enrolled at UM and has completed his freshman year.

Solution to Math Problem

Surprisingly, you can determine the whole polynomial from just two values. First ask for the value of $P(1)$. This is the sum of the coefficients, and so is an upper bound for all of them. Take b to be any larger integer, and ask for the value of $P(b)$. This number, written in base b, gives the sequence of coefficients. For example if $P(n) = 3n^2 + 4n + 2$ then $P(1) = 9$. Take $b = 10$. Then $P(10) = 342$. Of course, we usually write numbers in base 10, but this method works just as well no matter what b is.

Three Faculty Members Retire

Eugene F. Krause, Professor of Mathematics in the College of Literature, Science, and the Arts and the School of Education, retired from active faculty status on December 31, 2002.

After receiving his bachelor's and doctorate degrees from the University of Wisconsin, Krause (as he will always be known to the hundreds of mathematics education students who took his courses) joined the UM Department of Mathematics in 1963 as an instructor. He became a Professor in 1977, and served as Associate Chair for Education, from 1975-79.

Krause began his mathematics research career in the area of algebra but soon migrated toward mathematics education. For the past 20 years, Krause managed the mathematics education program, personally counseling a myriad of students who went on to teach at the elementary and high school levels. He was able to show his students how to demonstrate the complexities and beauty of mathematics to young students. Krause was able to utilize his mastery of the subject to not only communicate with his students, but also to explain ways of teaching these ideas to others. Krause always felt that rather than writing about teaching and how to teach, he could achieve more by writing textbooks, which embody new ideas. His publications include the books *"Elementary Mathematics for Teachers"* (with C. Brumfiel), *"Introduction to Linear Algebra," "Introduction to the Theory of Arithmetic*," and *"Mathematics I and II."* He contributed several articles to math-education journals and was considered a top expositor. Krause's monograph *"Taxicab Geometry"* is popular with both students and teachers.

During his tenure at UM Krause was considered a stellar teacher. His courses were quite demanding. His teaching evaluations are simply outstanding, and his commitment to his own teaching and to the teaching profession are evident. In reviewing his teaching evaluations, the majority stated that Krause was "the best teacher I ever had at UM" or that the course was "the most useful for my teaching career." Krause was effectively "teaching the teachers" of generations to come. Many of his students realize the valuable tools and resources they gained from Krause's instruction when they begin teaching, and contact him to thank him for their knowledge and experience.

Krause's dedication and strong teaching did not go unrecognized by the University. In 1979 he won the AMOCO Foundation Good Teaching Award; in 1982 he won the Ruth M. Sinclair Award in LSA Freshman-Sophomore Counseling; he received the College's Excellence in Education Award three times, Excellence in Concentration Advising award in 2001, and was recognized by the Panhellenic Association of Michigan as an outstanding teacher. In 1993 he was named a Fulbright Scholar and spent a year at Rhodes University in South Africa. He was a frequent speaker at both national and regional meetings of the National Council of Teachers of Mathematics and the School Science and Mathematics Association. The award that likely holds most meaning for him was given to him by his last math education class in 2002: After nominating him (unsuccessfully) for the University's Golden Apple Award, which signifies the best teacher at the University as chosen by the students, Krause's class presented him with an engraved "golden apple" paperweight, citing the paramount role he played in their educational careers.

To honor Krause's commitment to engaging new teachers in the art and science of teaching mathematics, a fund has been established in the School of Education to help new teachers of mathematics continue to enhance their skills and abilities. The fund will provide support for classroom materials, conference travel and other professional development opportunities related to the teaching of mathematics. Donations can be sent to UM School of Education, 610 East University, Ann Arbor, MI 48109-1259; ATTN: L. Stoianowski. Please indicate the donation is for the Eugene Krause Fund.

Mort Brown, Professor of Mathematics in the College of Literature, Science, and the Arts, retired from active faculty status on May 31, 2004.

Brown attended the University of Wisconsin, and received his Bachelor of Science degree in 1953 and his Ph.D. in Mathematics in 1958. He was an instructor at Ohio State University prior to joining the University of Michigan Mathematics Department on a fellowship from the Office of Naval Research. Brown was promoted to assistant professor in 1959, and became a Professor in 1964. During his tenure, he directed seven Ph.D. students.

Early in his career, Brown was recognized as an expert in topology, and he has presented papers and lectures by invitation on topology, high dimensional topology, and dynamical systems at universities and institutes throughout the world. In 1963 Brown received a Sloan Foundation Fellowship. In 1966 he received the Veblen Prize from the American Mathematical Society for his proof of the generalized Schonfliess theorem. He later grew interested in dynamical systems on 2-dimensional manifolds and, with Walter Neumann, gave an understandable and acceptable proof of a fixed-point theorem conjectured by Poincaré and Birkhoff. The original "proof" by Birkhoff in 1913 and "correction" in 1925 were considered controversial. His visiting appointments have included Cambridge University's Topology Institute, the University of Warwick, the Imperial College of London, Institute des Hautes Etudes Scientifiques in Paris, and the Institute for Advanced Study at Princeton.

Brown was active in administration at the department, college and university levels. In the Mathematics Department he served as Associate Chair for Education, a member of the Executive Committee on several occasions, and Doctoral Committee

Chair. He was a member of the LSA Executive Committee and the Rackham Executive Board. He served on the Board in Control of Intercollegiate Athletics for three years. Professor Brown was active in the Senate Advisory Committee on University Affairs (SACUA) and was the committee's chair in 1981-82.

As Associate Chair for Education in the late 1980s, Brown began implementing the first major revision of the undergraduate calculus program in nearly 20 years. In the early 1990s he initiated cooperative learning in calculus classes, dedicated classrooms with new technology to that approach, implemented a specialized training program for instructors, and oversaw the adoption of a reform textbook. The new introductory calculus courses incorporated group learning, a graphing calculator, team homework, and smaller classes. Brown is credited with providing a significant model for the national calculus reform movement, and was active on numerous national and state calculus reform committees. After the reform of the calculus program, he continued as Director of the elementary program in the department for several years.

To acknowledge his efforts in reforming calculus education and learning, Brown received Excellence in Teaching Awards from the College of LSA in 1992 and 1993. He was named a Thurnau Professor in 1994, recognizing his contributions to undergraduate education.

Paul Federbush, Professor of Mathematics in the College of Literature, Science, and the Arts, retired from active faculty status on May 31, 2004.

Federbush received a Bachelor of Science from the Massachusetts Institute of Technology in 1955, and in 1958 a Ph.D. in Physics from Princeton University. From 1958 to 1966 he was an instructor and assistant professor in the M.I.T. Physics Department. The year 1964-65 was spent on leave in the M.I.T. Mathematics Department. Federbush joined the University of Michigan Mathematics Department in 1966 as a Lecturer. He was promoted to associate professor in 1967 and to Professor in 1971.

In 1965 Federbush received a Sloan Foundation Fellowship. In 1975 he was a John Simon Guggenheim Memorial Fellow, and was a member of the Institute for Advanced Studies with a grant-in-aid. Eleven doctoral students received their Ph.D. degrees under his direction in either physics or mathematics. From 1991 to 1997 Federbush was Associate Chair for Education in the Mathematics Department. He served on many departmental committees and several college committees, and was the unofficial social chair of the Mathematics Department. The latter role provided Federbush with ample opportunity to exhibit his prowess as a polyglot.

As a teacher, Federbush handled the many and varied courses in applied mathematics, including many of the specialized and demanding courses designed for engineering students. He and a colleague developed student computer lab materials utilizing Matlab that continue to be used in the current introductory differential equations course, Math 216.

Federbush is a mathematical physicist working in statistical mechanics and quantum field theory. Early on he became interested in the part of field theory that could be put on a firm mathematical foundation, and in applications of field theoretic ideas to other areas of mathematics. One of his most influential papers (in 1969) was an infinitesimal version of Nelson's hypercontractive inequality in field theory. The Federbush inequality later became known as the logarithmic Sobolev inequality and is widely used in the theory of partial differential equations.

Another important work was his 1975 paper on the stability of matter, which gave a new proof of a classic result of Dyson and Lenard that a large neutral system of electrons and nuclei does not collapse. Unlike the original paper, the Federbush approach showed that the technique of phase space localization is central to the proof. Phase space localization became a focus of Federbush's research, particularly in proving results about correlations in Euclidean field theory. His most impressive result was the proof in 1981 (with David Brydges) of "Debye" screening, that in a charged neutral gas the effects of the long-range electromagnetic interactions are screened out. As part of his work on field theories he developed a set of orthogonal phase space localized functions–known as "wavelets"–which are divergence free. In a 1993 paper he explored a new direction, applying these wavelets to the Navier-Stokes equations of fluid dynamics. His current main research interest is in the Heisenberg model for quantum spin systems.

Hochster, continued from page 3

characteristic, where one then takes advantage of the Frobenius operator. Tight closure has provided deep new insight into the structure of commutative rings and has found striking applications to a surprisingly diverse collection of problems. Hochster and Huneke's notion of a 'test ideal' for tight closure has turned out to have deep connections with 'multiplier ideals,' another current hot topic in algebraic geometry arising for yet different reasons. Tight closure even appears to have interesting connections with a subject as seemingly remote as differential operators. Despite these apparently deep and diverse connections with other fields, tight closure is important and beautiful in its own right as an elegant tool for unifying and illuminating many basic constructions in commutative algebra, including Cohen-Macaulayness, integral closure, and homology modules.

Diversions

While mathematics keeps him quite busy, there are other diversions and interests in Hochster's life. These include cryptic crosswords and bridge. He is the unofficial organizer of a lunchtime bridge game that involves nearly twenty faculty members and graduate students over the course of a week. Most days he can be found at lunchtime in the common room or at a local restaurant with other bridge aficionados. The game is always open to new players, and new faces appear frequently. His home life is as active as his professional life, with a 14-year-old daughter and 8-year-old triplets to make sure there is never a dull moment. He has a grown son who is a mathematician and two grandchildren as well.

Math Department Chosen for Carnegie Program

The Carnegie Foundation for the Advancement of Teaching has selected the University of Michigan as a national, multi-year partner in a project to improve doctoral education at American universities.

The foundation's Carnegie Initiative on the Doctorate (CID), a research and action project designed to support departments' efforts to more purposefully structure their doctoral programs has tapped U-M's Chemistry, English, Educational Studies and **Mathematics** departments to participate in the five-year study. The departments will analyze all aspects of their doctoral programs and link specific activities to desired outcomes.

Carnegie Senior Scholar Chris Golde explained that the project goals are to support and study experiments in doctoral education with leading graduate programs, and to document and analyze the character of those initiatives. Then, working with these innovative units, the project will help the disciplinary community create models and evidence of success to inform others in the field. "We're working with departments that are committed to being stewards of their disciplines," Golde says. "We don't just mean a preservation of the heart and essence of the field, although that's important, but we chose those departments that have a critical eye toward the future, that are willing to take risks and move the discipline forward." The initiative has three interacting elements: a conceptual analysis of doctoral education, design experiments in departments, and research and dissemination.

UM and The Ohio State University were the only institutions to have four departments chosen to participate as partners. The 32 partner departments of the CID have committed to a serious deliberation about the purposes and desired outcomes of their doctoral programs. Departments will consider the strategies currently used to meet those goals. As a result of the deliberations, departments will propose changes in their program intended to better meet the agreed upon outcome goals. Taking a scholarly approach, departments further commit to gathering evidence about the impact of the changes.

"We are in a strong position to assist the Carnegie Foundation in a prolonged examination of reform in doctoral education," said Earl Lewis, former Dean of the Horace H. Rackham School of Graduate Studies. "I am pleased that the initiative has chosen four Michigan units to participate in this important national project. That all four of our projects were selected for inclusion is a clear sign of a level of commitment of the University and our colleagues to change."

The initiative is funded by the Carnegie Foundation and by the Atlantic Philanthropies, which identifies and supports leaders and organizations dedicated to learning, knowledge-building and solving pressing social problems.

2004 MMSS Program

The Michigan Math and Science Scholars (MMSS) had a highly successful 2004 program. Initially known as "math camp," and offering courses only in mathematics, the MMSS program is in its ninth year and offers courses in all areas of science to bright high school students from around the world.

Attendance at the two sessions this summer totaled 252 students. MMSS has become known internationally; 49 of this year's participants were from foreign countries. The Busan Science Academy in Korea sent 36 high school students to participate in MMSS.

"I think our website has been the main impetus to the increased enrollment from other countries," says MMSS program coordinator Warren Noone. "It was exciting to have the U.S., Canada, and seven other countries represented this summer. Besides the program's obvious academic benefits, these kids were part of a diverse student body and gained exposure to other cultures."

Participants could choose from a variety of courses in areas of mathematics, financial mathematics, mathematical modeling, embryology, field biology, genome sequences, physics, statistics, and astronomy. In the photo below, students from the Financial Mathematics course visit the trading floor of DTE Energy in Ann Arbor. Group activities and field trips also included the Detroit Science Center, Ann Arbor Art Fair, and Cedar Point amusement park.

Some financial assistance for tuition was available for participants this year. For information on how you can support this program through corporate or personal donations, please visit the MMSS website at www.math.lsa.umich.edu/mmss/.

The MMSS website includes detailed information and many more photos from the 2004 program, and will be updated with information on the 2005 summer program.

Addresses:

www.math.lsa.umich.edu/mmss

or email mmss@umich.edu.

100 Years of Actuaries

Some time in 1902 (or 1903), the first lectures in Actuarial Mathematics took place at the University of Michigan. James W. Glover began instruction in the mathematics of finance and insurance, and soon developed a broad curriculum in actuarial science. The exact starting date is a little unclear. What is clear is that Michigan has at least a century of actuarial excellence in education and research to celebrate, and celebrating is just what we did in 2003-04.

In April 2003, we had our inaugural Actuarial Commencement. Supported by the Cecil J. Nesbitt Commencement Lecture Fund that was established with memorial donations upon Nesbitt's passing, the 2003 graduates, parents and friends joined together for a "mini" graduation ceremony, followed by a catered luncheon in the atrium of East Hall. The commencement speaker was Susan M. Smith (BS Math 1963) who also happens to be a resident of Ann Arbor and recently retired from the local office of Towers, Perrin. In 2004 the commencement speaker was R. Stephen Radcliffe (MS 1968), President of American United Life Insurance Co. of Indianapolis. We plan to make this an annual tradition and to bring back former students of Cecil Nesbitt to be commencement speakers.

In August 2003, we hosted the 38th Actuarial Research Conference to celebrate the first 100 years of the Michigan Actuarial Program, and also "in celebration of the life of Cecil J. Nesbitt." It was fitting to have the conference back in Ann Arbor, which also hosted the first conference.

There were 41 scientific papers presented by 40 different researchers, representing 6 countries (and Ohio State—it not being quite clear how to count that representative). Attendance at the three day conference was in excess of 100 individuals from 8 countries. All of the events, including the elegant Conference Dinner, were held in the home of the Michigan Actuarial Program - East Hall.

In September 2003, UM hosted the semi-annual meeting of the Midwestern Actuarial Forum (casualty actuaries working in the Midwest). About 100 people attended this all day conference that was held in an academic site for the first time. In the spring of 2003, the Michigan Actuarial Society was hosted by the department for the first time. Despite bad weather, the turnout to hear Society of Actuaries' President Harry Panjer was good, and we hosted another meeting in 2004.

Elsewhere in this issue, you have been introduced to Virginia "Jenny" Young, FSA, Ph.D., the initial holder of the Cecil J. and Ethel M. Nesbitt Professorship in Actuarial Mathematics. Jenny joined us for the fall, 2003 semester. In addition, we are pleased that David T. Kausch, a 1994 Michigan Ph.D. graduate as well as an ASA, EA joined us at the same time.

With Kristen Moore, Ph.D., ASA and myself, the Michigan Actuarial Program is starting the second century of its existence with 4 full time actuarial faculty members, all of them with professional actuarial credentials (ASA or FSA) and all of them holding doctorates. In addition, enrollment in our undergraduate degree programs is quite robust and we have a steady stream of Master's degree candidates, as well.

Our students maintain an active student-run organization, the Student Organization of Actuaries, with programs in academics, sports and social activities. In 2003 there was an outreach program to a local high school by 4 of our students. We would like to develop a more extensive outreach program to area schools—to provide us with an opportunity to inform high school students about the actuarial field and to give our students the opportunity to develop their public presentation skills. The club also organizes several on-campus visits from interested employers.

We are excited about the start of the next 100 years for the Michigan Actuarial Program and look forward to hearing from any of our alumni/ae if you have any questions or suggestions for us.

- Curtis E. Huntington (BA 1964), FSA; Director, Financial & Actuarial Mathematics Program

A Chronology of Actuarial Faculty Members at UM

James W. Glover 1895-1938

Walter O. Menge 1928-1937

Thomas N.E. Greville 1931-1933, 1937-1940, 1962-1963

Cecil J. Nesbitt 1937-1980

Carl H. Fischer 1941-1974

Marjorie Van Eenam Butcher 1947-1956

Robert W. Butcher 1950-1956

Allen L. Mayerson 1956-1971

Donald A. Jones 1959-1991

Newton L. Bowers, Jr. 1965-1969

Hans U. Gerber 1972-1982

W. James MacGinnitie 1973-1985

Charles L. Trowbridge 1979-1983

Howard Young 1987 - 1997

Marjorie A. Rosenberg 1991-1994

Curtis E. Huntington 1993 - present

Kristen S. Moore 1999 - present

David T. Kausch 2003 - present

Virginia R. Young 2003-present

Below: Guests at the Actuarial Research Conference Dinner: (top l-r) David Kausch, Kristen Moore, Howard Young, Curtis Huntington; (bottom l-r) Jim Hickman, Jenny Young, Ethel Nesbitt, Marjorie Rosenberg, Marjorie Van Eenam Butcher.

PhD Recipients December 2002 - August 2004

Jason Aubrey completed his dissertation *"Pseudo-Dominating Families of Functions"* under the direction of Andreas Blass. He is an assistant professor at Northern Iowa University.

Sylvia-Pek Chiang completed her dissertation *"Vacuum State Problems of Different Systems of Conservation Laws"* under the direction of Joel Smoller. She will be a research scientist at the National University of Singapore.

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

Dean Chung completed his dissertation *"Computation of Cache Misses in Matrix Multiplication"* under the direction of Phil Hanlon. He has accepted a position at the Quadstone company.

Georgios Dalakouras completed his dissertation *"A New Fast and Robust Technique for Pricing and Hedging Asian Options"* under the direction of Kristen Moore. He has a position at Susquehanna International Group in Philadelphia.

Haggai Elitzur completed his dissertation *"Tight Closure in Artinian Modules"* under the direction of Mel Hochster.

Erik Ferragut completed his dissertations *"Detection of Epistatic Effects in Genetic Data"* under the direction of Phil Hanlon.

Julia Gordon completed her dissertation *"Some Applications of Motivic Integration to the Representation Theory of P-Adic Groups"* under the direction of Robert Greiss and Tom Hales. Julia will spend a year at the Institute for Advanced Studies and then has a postdoc position at the University of Toronto.

Theron J. Hitchman completed his dissertation *"Rigidity Theorems for Large Dynamical Systems with Hyperbolic Behavior"* under the direction of Ralf Spatzier. He is a postdoc at Case Western Reserve University.

Amanda Johnson completed her dissertation *"Multiplier Ideals of Determinantal Ideals"* under the direction of Karen Smith. She has a position with the National Security Agency.

Daniel Jupiter completed his dissertation *"Envelopes of Holomorphic and Approximation Theorems"* under the direction of Berit Stensones. He is a postdoc at Texas A&M University.

Benjamin Keen completed his dissertation *"A Kinetic Scheme for Gas Dynamics on Arbitrary Grids"* under the direction of Smadar Karni. He is a researcher for the Institute for Defense Analysis/Center for Computing Sciences.

Christopher Kennedy completed his dissertation *"An Exploration of Deep Matrix Algebras"* under the direction of David Winter. He has a tenure-track position at Edinboro University of Pennsylvania.

Elizabeth Klodginski completed her dissertation *"Essential Surfaces in Fibered 3-Manifolds"* under the direction of Peter Scott. She is a VIGRE Postdoctoral Fellow/ Visiting Research Assistant Professor at the University of California-Davis.

Scott Kravitz completed his dissertation *"The Homology of a Filtered Boolean Algebra"* under the direction of Phil Hanlon

Jonathan Korman completed his dissertation *"A Character Formula for Compact Elements Using the Building"* under the direction of Tom Hales. He is a postdoc at the University of Toronto.

Alex Kuronya completed his dissertation *"Asymptotic Cohomological Functions on Projective Varieties"* under the direction of Robert Lazarsfeld. He is a postdoc at Universität Duisburg-Essen in Germany.

Elliott Lawes completed his dissertation *"The Regular Shalika Germ and Motivic Integration"* under the direction of Tom Hales. He held a one-year lecturship at UM, and now has a position at the University of Toronto.

Krastio Lilov completed his dissertation *"Skew Products"* under the direction of John Erik Fornæss. He has a visiting position at State University of New York, Stony Brook.

Boris Mitavskiy completed his dissertation *"A Mathematical Model of Evolutionary Computation and Some Consequences"* under the direction of Andreas Blass. He is a researcher at the University of Birmingham, U.K.

Mihran Papikian completed his dissertation *"Optimal Elliptic Curves, Discriminants, and the Degree Conjecture Over Function Fields"* under the direction of Brian Conrad. Mihran received the 2003 Cornwell Prize. He is a Szego Assistant Professor at Stanford University.

Joel Pitkin completed his dissertation *"A Twisted Kazhdan Density Theorem: An Application of the Stabilized Twisted Trace Formula"* under the direction of Tom Hales. He is a risk management professional with Bear Stearns Investment Bank.

Marko Slapar completed his dissertation *"Real Surfaces in Complex Surfaces"* under the direction of John Erik Fornæss. He is a postdoc at the University of Ljubljana (Slovenia).

Peter Storm completed his dissertation *"The Barycenter Method on Singular Spaces"* under the direction of Dick Canary. He is an NSF postdoc and Dickson Instructor at the University of Chicago.

Ronald Walker completed his dissertation *"Concerning the Characterization of Boundaries of Holomorphic 1-Chains Within Complex Surfaces"* under the direction of David Barrett. He is a VIGRE Assistant Professor at Ohio State University.

Craig Christopher Westerland completed his dissertation *"Stable Splittings of Configuration Spaces of Surfaces and Related Mapping Spaces"* under the direction of Igor Kriz. He has a one-year position at the Institute for Advanced Study at Princeton, and then will join the University of Wisconsin.

Kevin Woods completed his dissertation *"Rational Generating Functions and Lattice Point Sets"* under the direction of Alexander Barvinok. Kevin received the 2004 Cornwell Prize. He is a NSF postdoc at the University of California, Berkeley.

Alexander Yong completed his dissertation *"On Combinatorics of Degeneracy Loci"* under the direction of Sergey Fomin. He is a postdoc at the University of California-Berkeley.

Graduate Program News

Graduate Awards 2002-2003

The Sumner Myers Prize, given for the best Ph.D. thesis in mathematics for the year 2002 was presented to two recent graduates. **Eduard Kirr** was selected for his thesis "*Resonances in Hamiltonian Partial Differential Equations*." Edward was a student of Anthony Bloch and Michael Weinstein, and is currently at the University of Chicago. **Daniel Rogalski** received the award for his thesis *"Examples of Generic Noncommutative Surfaces"* under the direction of Toby Stafford. Daniel is a Moore Instructor at Massachusettes Institute of Technology.

Mihran Papikian received the **Wirt and Mary Cornwell Prize**, recognizing a student who has demonstrated the greatest intellectual curiosity, given the most promise of original study and creative work in math. Mihran's dissertation *"Optimal Elliptic Curves, Discriminants, and the Degree Conjecture Over Function Fields"* was written under the direction of Brian Conrad.

Allen Shields Memorial Fellow
Abigail Ochberg

Arthur Herbert Copeland, Sr. Memorial Scholars
Hualong Feng
Bart Kastermans
Lu Lu

Calouste Gulbenkian Fellow
Oscar Felgueiras

Carroll V. Newsom Scholars
Milena Hering
Oichi Yuen

Computational Science Graduate Fellow
Benjamin Keen

Darrow Mathematics Graduate Student Scholars
Elizabeth Chen
Robert Houck
Paul Jeray

Departmental Alumni Scholars
Alina Andrei
Luciana-Maria Bobitan
Sara Heusel
Sukmoon Huh
Harsh Jain
Rizwanur Khan
Boris Mitavskiy
Alvaro Pelayo
Jody Radowicz
Khachik Sargsyan
Matthew Smith
Michael Vath
Kevin Wildrick
Bo Yang

Edwin Wilkinson Miller Prize
Peng Gao

E. S. & A. C. Everett Memorial Scholar
Joe Stubbs

Gabrielle & Sophie Rainich Fellow
Leonardo Mihalcea

Luther Claborn Mathematics Fellows
Mahesh Agarwal
Calin Chindris
Jungmin Choi

NSF Fellows
Samuel Payne
Ellen Veomett
Ronald Walker
Kevin Woods

Rackham One-Term Dissertation Fellows
Sylvia Chiang
Marko Slapar
Alexander Yong

Rackham Predoctoral Fellows
Mihran Papikian
Peter Storm

Regents Fellows
Trevor Fast
Hannah Robbins
Zachariah Teitler

NSF VIGRE Fellows
Trevor Arnold
Amy Bauer
Erik Bird
Grigoriy Blekherman
Jim Brown
Bryden Cais
Elizabeth Dewitt
Geoffrey Dietz
Philip Dutoit
Haggai Elitzur
Thomas Fiore
Jonathan Forde
Hester Graves
Elizabeth Klodginski
Scott Kravitz
Jason Kutch
Robert Lonigro
William Lorenz
Jessica Metcalf-Burton
Ivan Middleton
Charles Mueller
Benjamin Schmidt
Sreekar Shastry
Janis Stipins III
Lauren Toney
James Tung
Craig Westerland
Alexander Wolfe
Eric Zupunski

Paul Jeray, pictured with graduate coordinator Jennifer Wagner, was named a Darrow Mathematics Scholar. This award was established by Dale Darrow, a 1992 Mathematics Ph.D. recipient, to provide financial support for U.S. graduate students.

Graduate Awards 2003-2004

The Sumner Myers Prize, given for the best Ph.D. thesis in mathematics for the year 2003 was presented to **Peter Storm,** who was selected for his thesis *"The Barycenter Method on Singular Spaces"* Peter was a student of Dick Canary, and is currently a NSF Postdoc and Dickson Instructor at the University of Chicago.

Kevin Woods received the **Wirt and Mary Cornwell Prize**, recognizing a student who has demonstrated the greatest intellectual curiosity, given the most promise of original study and creative work in math. Kevin's dissertation *"Rational Generating Functions and Lattice Point Sets"* was written under the direction of Alexander Barvinok.

Allen Shields Memorial Fellow
Alina Andrei

Arthur Herbert Copeland, Sr. Memorial Scholars
Tobias Berger
Elizabeth Chen
Brian Jacobson
Kevin Wildrick

Calouste Gulbenkian Fellow
Oscar Felgueiras

Carroll V. Newsom Scholars
Sarah Crown
Afsaneh Mehran
Alison Northup
Svetlana Simakhina

Computational Science Graduate Fellow
Benjamin Keen

Darrow Mathematics Graduate Student Scholar
David Allen

Departmental Scholars
Sebastien Chivoret
Rizwanur Khan
Jared Maruskin
Hualong Feng
Kyung Yong Lee
Hyekyung Min
Sukmoon Huh
Nam-Hoon Lee
Alvaro Pelayo
Thiradet Jiarasuksakun
Bart Kastermans
Kenneth Keppen
Tong Liu
John Mackay
Feng Rong
Sourya Shrestha

Fulbright Scholar
Giancarlo Urzua

Gabrielle & Sophie Rainich Fellow
Eji Aoki

Lucent Fellow
Ellen Eischen

Luther Claborn Mathematics Fellows
Kyle Hofmann
Michael Lieberman
Michael Vath
Diane Vavrichek

Mathematics Alumni/Alumnae Scholars
Jungmin Choi
Jiarui Fei

Mathematics Department Fellow
Han Peters

Mathematics Department One-Term Dissertation Fellow
Leon Kaganovskiy

National Physical Science Consortium Fellow
Marie Snipes

National Defense Science and Engineering Graduate Fellow
Matthew Ong

National Science Foundation Fellows
Dennis Clark
Ryan Kinser
Kevin Woods

Rackham Dean's Discretionary Fellow
David Tello

Rackham Merit Fellows
Adeboye Ilesanmi
Naomi Martinez

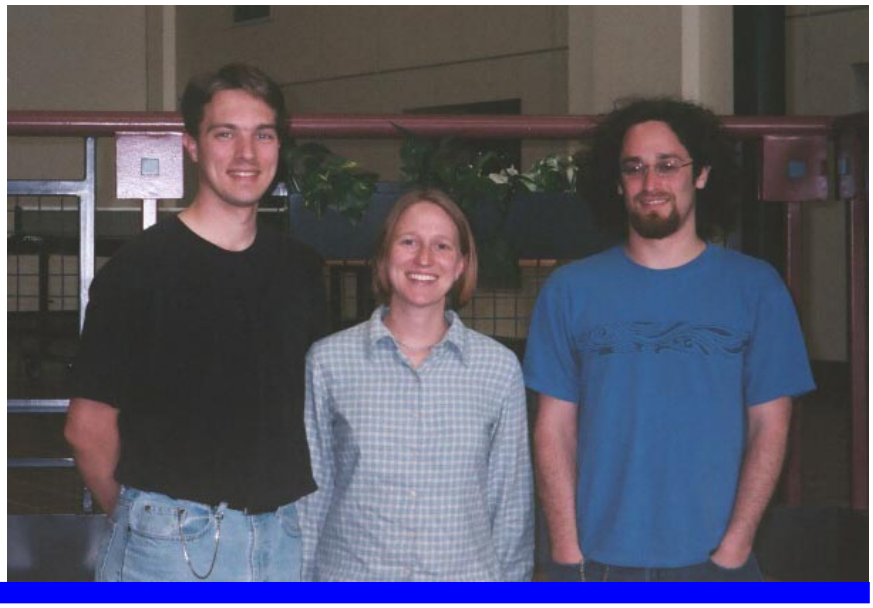
Rackham One-Term Dissertation Fellows
Scott Kravitz
Constantin Leonardo Mihalcea
Craig Westerland

Rackham Predoctoral Fellow
Alex Kuronya

Regents Fellow
Samuel Payne

Samsung Fellow
Yungkwon Kim

NSF VIGRE Fellows
David Anderson
Trevor Arnold (Fall)
Amy Bauer
Eric Bird (Winter)
Grigoriy Blekherman (Winter)
Bryden Cais (Winter)
Elizabeth Dewitt (Winter)
Geoffrey Dietz (Winter)
Philip Dutoit (Winter)
Thomas Fiore (Winter)
Jonathan Forde (Winter)
Jasun Gong
Hester Graves (Winter)
Jason Kutch
Robert Lonigro
William Lorenz
Jessica Metcalf-Burton (Winter)
Ivan Middleton (Winter)
Yogesh More
Charles Mueller (Winter)
Hannah Robbins (Winter)
Benjamin Schmidt
Sreekar Shastry
Craig Spencer
Andrew Stein
Zachariah Teitler (Winter)
Lauren Toney (Winter)
James Tung (Winter)
Ellen Veomett (Winter)
Alexander Wolfe (Fall)
Eric Zupunski (Winter)



Some 2003 Ph.D. recipients Theron J. Hitchman, Elizabeth Klodginski and Daniel Jupiter.

2003 Undergraduate Award Recipients

The Department's team for the William Lowell Putnam Mathematics Competition placed 40th out of 376 teams in the event. The 2003 team was comprised of **Thomas Dunlap, Anna Maltseva** and **Vivek Shende.** The individual competition included 3349 students from across North America. **Vivek Shende** received an honorable mention, placing the highest of UM students at 48. **Joel Louwsma** finished at 157.

The winner of the 20th Annual University of Michigan Undergraduate Mathematics Competition was **Vivek Shende. Shailesh Agarwal** and **Christopher Cunningham** tied for second place.

The following students received **M.S. Keeler Scholarships** for the 2002-03 academic year

Alexandra Achen
Jeffrey Allotta
Julia Arciero
Jacob Bernstein
Haywai Chan
Kevin Cody
Jeremy Cook
Spencer Dowdall
Walter Dulany
Matthew Elsey
Ann Huang
Jesse Kass
Elliot Lee
Justin Malestein
Anna Maltseva
Joseph McClain
Jason Miller
Kalman Nanes
Randolph Pistor
Kathryn Roeder
Vivek Shende
Ronit Slyper
Karl Weintraub
Christopher Zborzek

The following students received **Margaret S. Huntington Awards in Actuarial Outreach:**

Elizabeth Barrett
Lindsey Boegehold
John Chih Chang Huang
Thangaver Rathina Santosh Kumar
Andre Lobo
Lindsay Nelson
King-Leung Gary Ngan
Khoi Nguyen
Mikhail Somov
Laura Tedesco

The following students received **Evelyn O. Bychinsky Awards,** which recognize underclass students who show exceptional promise in mathematics:

Nitsan Ben-Gal
Jacob Bernstein
Haywai Chan
Sarah Iveson
Gregory Malivuk

Sarah Haeusler received the **Leon P. Zukowski Prize** for outstanding service in the Math Lab.

Graduating seniors Julia Arciero, Lynn Gromek and Elise Zipkin at the Awards Ceremony Reception.

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

Outstanding Achievement in Mathematics Awards went to the following seniors:

Julia Arciero
Gordon Berman
Daniel Coffield
Brian Drake
Thomas Dunlap
Lynn Gromek
Colleen Murphy
Joseph Tanniru
John Wang
Elise Zipkin

The **Otto Richter Memorial Prize in Actuarial Science** was presented to **Jason Gratson** and **Thomas Walker**.

The **CIGNA Award in Actuarial Science** was presented to **Alexander Geml** and **Russell Polcyn**.

The **Irving Wolfson Award in Actuarial Science** was presented to **Stacy Bittner**.

The **Lois Zook Levy Memorial Award** was presented to **John Baker**. The award recognizes an outstanding mathematics student who plans to pursue a career in K-12 mathematics education.

Jesse Kass was named the **Outstanding Graduating Senior.**

The inaugural presentation of the Lois Zook Levy Memorial Award. Pictured (l-r): William Baker, Hiram Levy, award recipient John Y. Baker, his fiance, and his mother, Susan Baker

2004 Undergraduate Award Recipients

The Department's team for the William Lowell Putnam Mathematics Competition placed 54th out of 401 teams in the event. The 2004 team was comprised of **Vivek Shende, Joel Louwsma** and **Chris Cunningham.** The individual competition included 3615 students from across North America. **Vivek Shende** placed the highest of UM students at 137.5. Freshman **Fernando Delgado Salas** finished at 212.

The winner of the 21st Annual University of Michigan Undergraduate Mathematics Competition was **Vivek Shende. Fernando Delgado Salas** placed second and **Christopher Cunningham** came in third.

The following students received **Margaret S. Huntington Awards in Actuarial Outreach:**

Juline Chen
Huey Fang Lim
Ninad Naik
Esther Ni
Mui Keng Oh
Kathy Ray
Jason Rose
Ethan Street
Donald Sullivan
Alice Zheng

Sarah Iveson received the **Leon P. Zukowski Prize** for outstanding service in the Math Lab.

The following students received **Evelyn O. Bychinsky Awards,** which recognize underclass students who show exceptional promise in mathematics:

Christopher Cunningham
Fernando Delgado Salas
Spencer Dowdall
Melinda Kleczynski

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

The **Sumner Myers Award in Analysis** was presented to **Jason Miller**.

Professors Curtis Huntington and Harm Derksen present an award to Fernando Delgado Salas (right). Fernando also received a Mathematics Alumni/Alumnae scholarship.

Outstanding Achievement in Mathematics Awards went to the following seniors:

Timothy Blass
Randall Coughlan
Sean Gerrish
Shaili Jain
Yu Hang Kan
Joel Louwsma
Gregory Malivuk
Joseph Mc Clain
Vivek Natarajan
Marina Polishchuk
David Wicklund

The **Otto Richter Memorial Prize in Actuarial Science** was presented to **Alexander Geml.**

The **CIGNA Award in Actuarial Science** was presented to **Julie Sachs**.

The **Irving Wolfson Award in Actuarial Science** was presented to **Heather Costello**.

The **Lois Zook Levy Memorial Award** was presented to **Kristen Barbosa**. The award recognizes an outstanding mathematics student who plans to pursue a career in K-12 mathematics education.

Brendon Rhoades received the **Wirt and Mary Cornwell Prize**, recognizing a student who has demonstrated the greatest intellectual curiosity, given the most promise of original study and creative work in math, and also shows an interest in music.

Justin Malestein was named the **Outstanding Graduating Senior.**

Professor Carolyn Dean (left) presents the Zukowski Prize to student Sarah Iveson. Sarah also received a Mathematics Alumni/ Alumnae Scholarship.

Undergraduate Degree Recipients 2002-03

Julia Arciero
John Baker
Gordon Berman
Stacy Bittner
Ann Byman
Dominique Caballero
Luyuan Chai
Daniel Coffield, Jr.
Antonio Cushman
Stephanie Dow
Brian Drake
Thomas Dunlap
Elizabeth Fedorowicz
Robert Feeney
Christopher Gardner
Sara Goldberg
Jason Gratson
Lynn Gromek
Rahul Gupta
Sarah Haeusler
Peter Huff
Andrew Hutchinson
Leslie Johnson
Jesse Kass
Debra Kearney
Megan Kern
Cook-Hwan Kim
Amy Kimball
Matthew Klein
Horyan Kong
Priya Kothary
Mark Lazzo
Paul Lee
Jacob Lessem
Li Lin
Benjamin Low
Diena Lukawski
Olga Malykh
Dara Marshall
Tanya Morey
Colleen Murphy
Nicholas Murphy
Kalman Nanes
Nina Palmo
Angelo Perez
Russell Polcyn
Suzanne Schlegel
Sauravendra Sen
Xiao Shu
Noriyuki Sugiyama
Karyn Sutton
LiLeng Tan
Joseph Tanniru
Michael Topper
Rachel Victor
James Vosotas
Thomas Walker
John Wang
Alexis Wesaw
Nikia Williams
Jason Wilson
Tin Yu
Elise Zipkin

Minors

Kenji Aoki
Kartik Arekapudi
Adam Beernaert
Christopher Bishop
Karl Brakora
Alexander Butterwick
Jun Chan
Brian Cheung
Bryant Choe
Michael Ciulis
Bradley Covell
Jennifer Denbow
Jason Dillaman
Benjamin Everson
Megan Flynn
Meghan Garstang
Christopher Grewe
Julie Hengehold
William Herrington
Matthew Horning
Tina Hsieh
Elizabeth Huebner
Henry Hyatt
Audrey Johnson
Sergey Klibanov
Himanshu Kumar
Peter Kwan
Michael La Marca
Adrien Lazzaro
Robert Lee
Molly Lynn
Eric Lyster
Nicole Martin
Ryan McClarren
J. Brandon McClimon
Megan Medea
Sandeep Murti
Sangwook Oh
Wichai Pawgasame
Vishal Rao
Josh Rovey
Shabeta Sahore
John Schafer
Marc Shmerling
Lukas Skoog
Shun Chi Tam
Landry Tientcheu
Michael Yates
Jonathan Yee
David Yogiaman
Alex Yue
Vladimir Zlatkin

Undergraduate Degree Recipients 2003-04

Norazura Abdrahim
Megan Albertson
Jeffrey Allotta
Ryan Anderson
Megan Baker
Chetan Balwe
Kristen Barbosa
Bradley Barker
Matthew Battin
Ignacio Benedetti
Nitsan Ben-Gal
Kathryn Bircheff
Timothy Blass
Jason Breck
Anne Brenner
Melissa Bylsma
Michael Callahan
Mihir Chandra
Lu Lu Chang
Tin-Yan Cheung
Stephanie Chin
William Christopher
Kevin Cody
Jamie Coleman
Louise Conlon
Randall Coughlan
Kathleen Crone
Jennifer DeVree
Brandon Dobbins
Andre' Echols
Eugene Eng
Kristin Essary
Nora Fitzgerald
Nicholas Flees
Nicholas Foley
Alexander Geml
Sean Gerrish
Michael Geske
William Gitterman
Rajendra Gorrepati
Matthew Graham
Rita Han
Rorujorona Harris
Kyle Herrity
Tuyet Ho
Yoshiyuki Ikeda
Shaili Jain
Kurt Kan
Yu Hang Kan
Martin Kandes
Kara Knauf
Geoff Kobayashi
Guha Krishnamurthi
Ron Lai
Joel Louwsma
Nicholas Lui
Gregory Maczka
Justin Malestein
Robert Dean Malmgren
Adam Malovance
Diana May
Joseph McClain
Insun Mo
Peter Morden
Sheela Nair
Vivek Natarajan
Nicole Naum
Ronni Neeman
Kristin Newton
Julia Nisbet
Elisa Pagan
Seongweon Park
Zhachary Pavlov
Thien-An Pham
Connel Pinto
John Policicchio
Marina Polishchuk
David Putterman
Raehan Qureshi
Joseph Raisanen
Walter Ray-Dulany
Michael Roberson
Matthew Ross
Jonathan Roth
Aditi Saxena
Evan Schulz
Douglas Spolyar
Kristina Stefanou
Paul Suberlak
Jerrilyn Thompson
Tu-Anh Tran
Ka Kit Tsui
Fusaka Tsujioka
Andrew Wagner
Helen Wang
David Wicklund
Robert Wyatt
Young-Yun Yang
Joel Zammit
Vladimir Zlatkin
John-Paul Zammit

Minors

Yasemin Akdas
Joshua Bartlett
Edward Baskerville
Christopher Battey
Paul Belden
Albert Bertram
Justin Bertschi
Kevin Borders
Cameron Cary
Melissa Chase
Benjamin Chess
Albert Tzu-Cheng Chuang
Edward Courtney III
Vikas Dayal
Nicholas Degrazia
Brendan Dillon
Stanko Dimitrov
Artem Dmytrenko
Douglas Douma
Zachary Drennen
Mira Fleisher
Ping Fu
Joseph Gatt
Jeffrey Germond
Anthony Girolamo
Clara Gonzalez
Rachel Gunnett
Amanda Halash
Lei He
Ryan Hesselink
Mark Hodges
Peter Janowski
Wei Jiang
Michael Katelman
Aaron Keys
Minjoo Kim
Masako Kishida
Yevgeniya Kleyman
Jay Kopfer
Oscar Lahoud
Sangeetha Lakshminarayanan
Robin Landfair
Erwin Lau
David Leibrandt
Heen Choong Leong
Man Wai Leung
Sinman Leung
Jeffrey Lev
Aimee Leyton
Arianne Liepa
Thomas Liu
Christopher Lyman
Kevin Makowski
Maya Mandel
Edward Mansour
Jason Mattiacci
Nicholas Maxwell
Karen Mesko
Dilber Mutlu
Kenneth Narra
Heather Nast
Jennifer Olson
Orkan Ozturk
Nathan Pacer
Stephanie Pakula
Rohini Pandhi
Heather Petres
Stephanie Pickard
Kristina Poulos
Ranjana Ram
Joshua Ray
Adam Sailor
Peter Song
Kristen Scheibach
Stephen Stamatis
John Sterzick
Sveta Lana Stolbov
Jonathan Stone
Albert Tong
William Uhl
Aaron Wolf
Emily Wolters
Diana Wong
Brian Young

Alumni Profile
Dr. Clarence Stephens

"More than fifty years ago I came to the conclusion that every college student who desired to learn mathematics could do so. I spent my entire professional life believing that this was the case." It is for his outstanding success in converting that belief into reality that UM alumnus **Clarence Francis Stephens** (MS '39, PHD '43) was presented the 2003 Yueh-Gin Gung and Dr. Charles Y. Hu Award for Distinguished Service to Mathematics from the Mathematics Association of America.

Clarence Stephens with Bob Megginson at the MAA Awards Ceremony, January 2003.

As chair of the Mathematics Department at the State University of New York at Potsdam from 1969 through 1987, Stephens was the primary architect of the "Potsdam Miracle" that resulted in this small upstate SUNY campus, with a total enrollment of less than 4000 in the middle 1980s, graduating the third largest number of mathematics majors among all U.S. institutions of higher education in each of the years 1985 through 1987. About a quarter of all the bachelor's degrees given at Potsdam each of those three years went to mathematics majors. This was not accomplished by lowering standards in any sense; the mathematics majors were among the strongest students at the institution, dominating the President's List of high-achieving students and producing seven of the eight valedictorians for the period 1980–87. Nor was it done at an institution with a long mathematics tradition. No student who graduated from SUNY Potsdam between its founding in 1816 and the arrival of Stephens in 1969 is known to have gone on to earn a Ph.D. in mathematics, although twelve students who graduated during Stephens's time have done so, half of them women.

Stephens was also responsible for a similar but earlier "miracle" at Morgan State College in Baltimore (now Morgan State University). Both "miracles" were accomplished by a combination of Stephens's strong faith in students' ability to master high-level mathematics when it is taught in a supportive and nurturing environment, and his equally strong encouragement of excellence in instruction through a program designed to draw out the best in each teacher.

Stephens was born on July 24, 1917 in Macon, Georgia. He and his brothers attended the Harbison Institute, a boarding school in Irmo, SC. Stephens and all five of his siblings went on to college, and all graduated, with all brothers and one sister receiving baccalaureate degrees from Johnson C. Smith University in Charlotte, NC and the other sister a degree from a two-year college. Each of the brothers majored in mathematics.

Stephens had planned to become a high school mathematics teacher after graduating, but during his senior year he was persuaded by JCSU's Dean of the College of Liberal Studies, T.E. McKinney, to enter the master's program at the University of Michigan. He did so in the fall of 1938. Along the way one of his mathematics professors, **George Yuri Rainich**, persuaded Stephens of his potential and encouraged him to continue on to the Ph.D. In 1943 he became only the tenth African American to obtain a Ph.D. in mathematics. From the guidance and encouragement he received from McKinney and Rainich, Stephens saw in a direct, personal way the impact that mentoring by faculty can have on the decisions students make about continuing a career in mathematics. This lesson was put to good use in the programs he later designed at Morgan State and Potsdam.

After service in the Navy and teaching at Prairie View State College in Texas, Stephens accepted a position at Morgan State. To his surprise and initial dismay, he was offered the position of chair of the department, which would put him in charge of a department of mathematicians, all older than him, at the tender academic age of 30. He was dismayed at the level of mathematics that was being offered to students at Morgan State. Stephens believed that one of the best ways to prepare students for graduate study in mathematics was, first, to get them into calculus courses as early as possible, providing an atmosphere in the department and in such courses that was nurturing and offered role models to show them that success was possible. Second, he wanted the students to be exposed to graduate mathematics, despite Morgan State's not having a graduate program. He instituted an Undergraduate Honors Mathematics Program that exposed undergraduates to first-year graduate mathematics and drew a large percentage of Morgan State's best students to major in mathematics. One consequence was that, although Morgan State had no student go on to obtain a Ph.D. in mathematics during the ninety years of its history before Stephens's arrival, at least nine students who passed through its mathematics program during Stephens's time there eventually obtained that degree.

After fifteen years at Morgan State, in 1962 Stephens moved on to a position as Professor of Mathematics at SUNY Geneseo, where he would remain until 1969. In the spring of that year, he visited the Potsdam campus as a lecturer sponsored by the Seaway Section of the MAA, and so greatly impressed the Potsdam mathematics faculty with his ideas on the teaching of mathematics that they immediately began a campaign to have him move to their department as its chair. He did so in the fall of that year, and the rest is history.

Professor Stephens lives with his wife, Harriete, whom he met at UM where Mrs. Stephens was beginning her studies for the Master's degree in mathematics. She is currently Professor Emerita of Mathematics at SUNY College of Technology, Canton. The couple's daughter has a Ph.D. in Mathematics Education from the University of Iowa, and their son has a Master's degree in Mathematics.

- Contributed by Robert Megginson

Alumna Receives Honorary Degree

At the April 2004 Commencement exercises, Professor Karen Uhlenbeck (BS 1964) was granted an honorary doctorate from the University of Michigan. Uhlenbeck is one of the world's foremost researchers on non-linear differential equations and their geometric properties. She is professor of mathematics at the University of Texas at Austin and since 1988 has held the Sid W. Richardson Foundation Regents' Chair in Mathematics. She is widely acclaimed as a talented and creative mathematician, as well as someone who has made a serious commitment to young women mathematicians.

After graduating from the University of Michigan in 1964 with a Bachelor of Science degree in mathematics, Uhlenbeck continued her studies at the Courant Institute in New York. She then entered Brandeis University and was awarded an M.A. and a Ph.D. in 1966 and 1968, respectively. Before going to the University of Texas, she taught at the Massachusetts Institute of Technology; the University of California, Berkeley; the University of Illinois, Urbana-Champaign; the University of Illinois, Chicago; and the University of Chicago.

During her career, Uhlenbeck has made pioneering contributions to global analysis and gauge theory that resulted in advances in mathematical physics and the theory of partial differential equations. She has been called variously a differential geometer and differential topologist and a non-linear analyst; her work has made contact with modern high energy physics, in particular with string theory. She is also interested in the ways complex mathematical concepts find uses in research in other areas of science, such as ecology, molecular biology and the structure of materials.

In recognition of her outstanding contributions to mathematics, Uhlenbeck has been the recipient of numerous prestigious honors and awards. In 1982 she received a MacArthur Fellowship, and in 1985 she was elected to the American Academy of Arts and Sciences. In 1986, she became one of the first women mathematicians to be elected to the National Academy of Sciences, and in 1990 she became the second woman to give a Plenary Lecture at the International Congress of Mathematics. In 1995 she received the CommonWealth Award for Science and Technology, and in 2000 she received a National Medal of Science for "special recognition by reason of [her] outstanding contributions to knowledge" in mathematics. She was previously honored by UM in 1984 when she received the Alumna of the Year Athena Award.

For her contributions to mathematical analysis and gauge theory leading to major advances in mathematical physics and the theory of partial differential equations, and for her commitment to the education and encouragement of women mathematicians, the UM presented Uhlenbeck with the honorary degree Doctor of Science.

Singer Wins Abel Prize

The Abel Prize, established by the Norwegian government in 2001 as an annual "Nobel Prize for Mathematics," was awarded this year to Sir Michael Francis Atiyah of the University of Edinburgh and UM Mathematics alumnus Isadore M. Singer of the Massachusetts Institute of Technology.

The prize is being given for the work that led to the names Atiyah and Singer being forever linked in the field of mathematics: the "Atiyah-Singer Index Theorem", which they formulated and proved in a series of papers they published in the early 1960s. The Index Theorem provides a bridge between pure mathematics (differential geometry, topology, and analysis) and theoretical physics (quantum field theory) that has led to advances in both fields.

The Norwegian Academy of Science, which oversees and manages the new prize, referred to the Index Theorem as "one of the great landmarks of 20th century mathematics". It is no exaggeration to say that the result changed the landscape of mathematics.

Singer, speaking to BBC News (March 26), said: "I am delighted to win this prize with Sir Michael. The work we did broke barriers between different branches of mathematics and that's probably its most important aspect. ... It has also had serious applications in theoretical physics." Referring to the creation of the Abel Prize, he added "I appreciate the attention mathematics will be getting. It's well-deserved because mathematics is so basic to science and engineering."

Singer received his undergraduate degree from the University of Michigan in 1944. After obtaining his Ph.D. from the University of Chicago in 1950, he joined the faculty at the Massachusetts Institute of Technology (MIT). Singer has spent most of his professional life at MIT, where he is currently an Institute Professor. Singer is a member of the American Academy of Arts and Sciences, the American Philosophical Society and the National Academy of Sciences (NAS). He served on the Council of NAS, the Governing Board of the National Research Council, and the White House Science Council.

In 1992 Singer received the American Mathematical Society's Award for Distinguished Public Service, recognizing his "outstanding contribution to his profession, to science more broadly and to the public good." Among the other awards he has received are the Bôcher Prize and the Steele Prize for Lifetime Achievement, both from the American Mathematical Society, the Eugene Wigner Medal (1988), and the National Medal of Science (1983).

When Singer was awarded the Steele Prize his response, published in Notices of the American Mathematical Society, was: "For me the classroom is an important counterpart to research. I enjoy teaching undergraduates at all levels, and I have a host of graduate students, many of whom have ended up teaching me more than I have taught them." Singer has also written influential textbooks that have inspired generations of mathematicians.

2004 Alumni/Alumnae Scholarship Recipient Profiles

Sarah Iveson is a senior who originally enrolled in the College of Engineering. After a year she switched her major to math, and with every math class that she took, her love of the subject grew. While Sarah enjoys all areas of math, algebra is her favorite. She worked in the Math Lab, and this year received the Leon P. Zukowski award for outstanding tutor. In previous years she received a Bychinsky award, and a Keeler scholarship. Sarah has made great efforts to support herself through school. Receiving this funding has relieved some of her financial concerns. Sarah will continue studying math in graduate school after her graduation in December.

Fernando Delgado Salas just completed his freshman year. He has proven to be one of the brightest undergraduate students in the department. Fernando was a member of this year's Putnam Competition team, and received Outstanding Achievement recognition for his individual performance in the competition (second of the UM student participants). He also placed second in the UM *Undergraduate Mathematics Competition*.

Jiarui Fei is a first year graduate student. After studying applied math at the undergraduate level, his graduate studies have been in pure mathematics. He shows exceptional promise as a mathematician and has already passed his qualifying exams in algebra and analysis. Jiarui says that he "loves math, the art of discovering the ultimate secrets of nature. The funding will help me stay in Ann Arbor this summer to continue studying math."

Jungmin Choi is a fourth year graduate student. Her undergraduate studies in math education led to her desire to teach students the beauty of math. Jungmin is in the Applied and Interdisciplinary Mathematics (AIM) program here, studying financial mathematics with Mattias Jonsson. The scholarship has allowed her to continue her research this summer and prepare for the birth of her child.

Development and Fundraising Update

New initiatives and funding of current programs highlight the efforts to raise funds for the department.

A new award was established by the family of alumna **Lois Zook Levy** (BS 1959, MS 1962). The inaugural award was given to **John Baker**, who plans a career in teaching, and the 2004 award was given to **Kristen Barbosa** (see undergraduate award pages). **Hiram Levy**, Lois' husband, personally presented the awards. The endowment fund is now at a level that produces a significant prize each year. The department appreciates the generosity of the Levy family and friends who supported this award and created the endowment.

After several years of investigation, the department was able to secure funds from a bequest from alumni **G. Cleaves Byers** (B.A. 1941, Ph.D. 1953 Duke University). Byers, a native of Hancock, Michigan, was a faculty member at Michigan Technological University from 1953 until his retirement in 1981. He served as head of the Mathematics Department there from 1963 to 1968. Byers conceived and developed the Digital Computer Laboratory at Michigan Tech, one of the first digital computer labs at the university. Michigan Tech later honored him by establishing the Byers Center for Computational Mathematics. The bequest to the UM established the G. Cleaves Byers Endowment for Collegiate Mathematics Education. The funds will be used for scholarships or other purposes that help young mathematicians (graduate students or young faculty less than 2 years past Ph.D.) seeking academic careers to achieve excellence in collegiate mathematics education.

In December 2002, Chair Trevor Wooley set the goal of funding the **Sumner B. Myers Memorial Prize** endowment to the level of $45,000 within five years. The Sumner Myers prize, given to a Ph.D. recipient whose thesis is judged to be the most outstanding for that calendar year, was established as a memorial upon the death of faculty member Sumner Myers in 1955 at the age of 45. The original funding for the prize has been depleted. Wooley challenged the faculty to give to the fund and agreed to match any faculty gifts by 50% from departmental funds. Emeritus faculty, friends of the department, and former Sumner Myers Prize recipients were also asked to help with the funding of the prize. The total raised to date, including matching funds and outstanding pledges, is $24,275.

In 2001 Professor and Mrs. Cameron Courtney established the **Cameron and Jack Courtney Graduate Fellowship in Mathematics**. The fellowship is named after Cameron Courtney (M.S. 1957, Ed.D. in Math 1965) and his son John (Jack) Courtney (Ph.D. 1993). The fellowship was established through a charitable remainder trust. Cameron Courtney passed away in 2004, and the trust has been transferred to the Department of Mathematics. The fellowship will be awarded next year to a deserving graduate student.

In 2003 the department initiated the **Mathematics Alumni/Alumnae Scholarship** fund. In a mailing to all alumni/alumnae, Wooley asked them to support an expendable fund to support undergraduate and graduate students. This is the first such fundraising effort by the department since 1996. The department received donations from more than 100 donors in 2003, including some funds from matching corporate gifts. The money was used to support deserving students during the 2003-04 academic year (see story above). The chair again asked for alumni/alumnae support in June 2004. As more money is received, more students will benefit from your generosity.

To protect the privacy of our donors, their names will not be listed in this newsletter. The administration, faculty and students of the mathematics department truly appreciate the thoughtfulness and generosity of the donors to all of the initiatives. Your support is paramount to our mission. If you are interested in giving to any of the above initiatives, or for general departmental support, please call 734-647-4462, or email math.mich@umich.edu.

Alumni/ae Updates

Bob Nusbaum (BA 1970, MBA 1978 Harvard) is a senior product marketing manager at Brocade Communications Systems. Regarding Tom Storer's retirement he says "My greatest lesson from Professor Storer's topology course - besides topology - was that effective teaching, or communication of any sort, emanates from the ability to convey complex ideas in simple language. That has made a huge difference in this student's career and life."

Alan Wilde (BS 1970, MA 1973) will be included in the 2003 edition of Who's Who in the World. He is listed on the National Aviation and Space Wall of Honor at the Smithsonian Institute.

Richard Fleissner (MA 1976) is a corporate budget and planning manager at the Amerisure Companies.

Michael Frank (BS 1987) joined Aquarius Capital as president in 2002.

James Mercurio (BS 1989) screened his film "March" at the Michigan Theater in Ann Arbor in 2002. Mercurio is director/coproducer of the film, and helped fellow UM alum Dean Morini (1990) write the screenplay.

Carol Fan (MS 1992, PhD 1997) is a mathematician at RAND, a "think tank" in Santa Monica, California.

Husaini Hussin (BS 1992) is an ERP manager at Shell Information Technology International in Malaysia.

Anna Callahan (BS 1993) released her debut CD as a jazz singer-trumpter in August of 2002. Since graduating from UM, she has written a book on music arranging, performed in various groups and taught music at California State University at Long Beach. She now performs with her own groups around the Los Angeles area and is planning a national tour. Information about her music can be found at www.annacallahan.com.

Anthony Vazanna (PhD 1998) is an assistant professor at Truman State University. He was named 2002 Missouri Professor of the Year by the Carnegie Foundation for the Advancement of Teaching and the Council for Advancement and Support of Education. Vazzana was selected from 422 faculty members nominated by colleges and universities throughout the country.

Obituary

The Department lost a good friend and strong supporter in 2003. **Miner (Mike) S. Keeler** passed away in May 2003. He was 78. Keeler received a bachelor's degree in mathematics from UM in 1947. Upon graduation he joined the family business, Keeler Brass Company of Grand Rapids, and served in a variety of positions, including President/CEO, and Chairman of the Board. Under his management, the company grew from 800 to 3000 employees. He also served as Director of Old Kent Bank from 1965 to 1990.

Throughout his career, he continued his interest in mathematics by posing mathematical challenges for himself—and consulting with UM faculty members. As a long-time friend of the department, Keeler contributed generously to the mathematics department for many years. He endowed a scholarship fund from which many undergraduates have benefited (see page 13), and funded the Keeler Lecture Series, which proved stimulating for faculty and students. Most recently he contributed $1.5 million for the establishment of the M.S. Keeler II Professorship in Mathematics and an additional $600,000 for Miner S. Keeler II Fellowships in Mathematics.

Keeler's philanthropic interests extended to other causes as well. He and his wife, Mary Ann helped bring the Alexander Calder stabile "La Grande Vitesse" to Grand Rapids in 1969. The sculpture has since become the city's symbol, gracing street signs and stationery letterheads. Keeler's fundraising efforts helped establish Grand Valley State University in 1960. He was an accomplished sailor and was the first finisher of the Chicago to Mackinac race in 1980.

"Mike's passion was mathematics," says former Math Department Chair Don Lewis. "As an undergraduate he took many graduate level courses. On graduation, he had to choose between becoming a full time mathematician, or entering the family business. Family loyalty led to his decision to enter business, but he never lost his interest in mathematics. In retirement he devoted himself to studying mathematics. His love for the University of Michigan and of mathematics led him to take a great interest in the department, and he took great pleasure in seeing the advances the department had made. The department, and I personally, will miss him."

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, November 12, 2004
- Visit the department for afternoon tea (3:45 sharp) if you are in town for the weekend, including Homecoming, Parent's weekend, or the Presidential Society weekend
- 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 734-647-4462

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 may include the Department of Mathematics in your estate plan. Please call us at 734-647-4462 for information on charitable trusts and bequests to the department, or contact:

University of Michigan
Development/Planned Giving
734-647-6000

What Are You Doing?

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_____

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