

View from the Chair's Office - Mel Hochster

There is a great deal of excitement evoked by several innovative programs in the Mathematics Department this year. While classes in the first year introductory courses had already been capped at 32 students (and are usually a bit smaller than that), a recent Provost's initiative is enabling us to reduce class sizes further. This year, we are experimenting with smaller sizes: for example, sections of our Calculus I courses have enrollment capped at either 18 or 24 students, and in the winter, Calculus II sections will be capped at 24 students. Math 217, Linear Algebra, has a cap of 18 students per section. Smaller classes permit a highly interactive style of teaching with great student involvement, and particularly benefit the large number of freshmen in Calculus I and II. The smaller courses will also result in several new positions for the Department, with the largest increase being approximately 16 new positions over a two-year period in the Postdoctoral Assistant Professor category.

Our introductory program has already received accolades both in an article by Jerome Epstein on the Calculus Concept Inventory in the Notices of the AMS [available at www.ams.org/notices/201308/rnoti-p1018.pdf] and in an MAA evaluation, and we are very hopeful that the new reduction in class sizes will enable us to do even better. The reformed Calculus program at Michigan marks its 25th anniversary in 2017, the same year that the University will be celebrating its bicentennial.

We have introduced a new Masters program, joint with the Statistics Department, in Quantitative Finance and Risk Management, with 18 students in the first incoming class. We expect to admit 30 students a year when this program is in a steady state. More detailed information on the program can be found on page 5.



The Michigan Center for Applied and Interdisciplinary Mathematics (McAIM) will begin in September 2016, with funding from LSA, the School of Engineering, the Mathematics Department, and resources provided in a bequest from James Van Loo. The Center aims to be a focus for activities integrating mathematics with the sciences throughout the University. There will be yearly themes, sponsorship for the Van Loo Postdoctoral Fellowship Program, workshops to identify and explore timely issues at the forefront of applied mathematics, advanced summer schools for graduate students and postdocs, as well as a short-term visitors program. We expect this Center to achieve national prominence.

The Michigan Math and Science Scholars program, in which I participate every summer, has expanded from two sessions a summer (each with several two week courses) to three sessions. High school students can take a variety of courses in mathematics and other scientific areas. These courses provide an introduction to and hands-on experience in research. Dates for the 2016 MMSS program are available on our website www.math.lsa.umich.edu/mmss/.

The Department experienced two great losses this year. Don Lewis, who chaired the Department for nine years, started the VIGRE program at NSF while he was Director of the Mathematics Division there, and was the driving force behind the Department's move to East Hall, passed away in February (see page 6). I was the beneficiary of his valuable advice throughout my time as chair, right up to the very last week of his life. He was at the Department every week to attend colloquia and seminar talks. The Department now has D. J. Lewis Research Assistant Professors as well as T. H. Hilbrandt Research Assistant Professors, and I am happy to say that we introduced them while Don was around to know about it.

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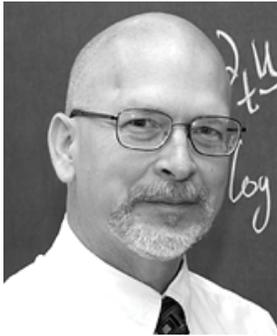
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Doering, Gilbert, and Lagarias Named Collegiate Professors

Three Mathematics Professors have been named Collegiate Professors by the College of LS&A.

Charles Doering has been named the Nicholas D. Kazarinoff Collegiate Professor of Complex Systems, Mathematics, and Physics. Doering received his Doctorate in Physics from The University of Texas at Austin in 1985. Following a one year post-doctoral fellowship at Los Alamos



National Laboratory, Doering began his career as an assistant professor at Clarkson University in 1987. He was promoted through the ranks to research professor and served as chair of the Department of Physics from 1991 to 1994. He returned to Los Alamos in 1994 where he served as Deputy Director of the Center for Nonlinear Studies. Doering joined the UM Mathematics Department in 1996, and later gained appointments in Physics (2007) and Complex Systems (2010), where he is currently Director.

Doering's research is in the areas of fluid mechanics and nonequilibrium statistical physics. He studies a wide diversity of problems and brings a variety of technical skills to address those problems. He has published papers on convection in fluids, neurons, rotary DNA motors, stochastic ratchets, random walks, species annihilation, turbulence, and even tuberculosis. In recognition of his research contributions, he has been elected as a fellow of the American Physical Society and of the Society for Industrial and Applied Mathematics. He

has been a plenary speaker at SIAM and at meetings of the American Mathematical Society, and has been the recipient of fifteen National Science Foundation grants. To date, Doering has published 140 papers that have collectively been cited over 6,000 times. He is the recipient of a Fulbright Scholarship, a Humboldt Research Prize, and a Simons Fellowship in Theoretical Physics.

At UM, Doering has taken on numerous teaching, mentoring, and administrative responsibilities within the college and his departments. He has been the primary advisor for more than a dozen Ph.D. students and he frequently co-authors papers with his graduate students. He has also served on more than 30 other Ph.D. committees from thirteen departments, ranging from Physics to Naval Architecture and Marine Engineering to Chemistry. Doering's service to the academic community includes directing a program at Woods Hole Oceanographic Institute, serving on numerous committees, including as a member of the board of governors of the Institute for Mathematics and its Applications (IMA), and has organized more than a dozen conferences. Doering has been Director of the Center for the Study of Complex Systems since 2013. He has also been active in the formation of a new mathematics research center (Michigan Center for Applied and Interdisciplinary Mathematics, or McAIM) that will serve the extended applied mathematics community across campus.

The professorship is named for Nicholas D. Kazarinoff, a UM Mathematics faculty member from 1956 to 1972. His main research interests were dynamical systems and partial differential equations, especially reaction-diffusion systems. He left UM to chair the Department of Mathematics at SUNY Buffalo, where he stayed until retiring in 1990. He passed away in 1991.

Anna Gilbert has been named the Herman H. Goldstine Collegiate Professor of Mathematics.



Gilbert received her Doctorate from Princeton University in 1997. She was a technical researcher at A. T. & T. Research Laboratories prior to joining UM as an assistant professor in 2004. Gilbert was promoted through the ranks to professor in 2010, and is also a professor in the College of Engineering.

An applied mathematician, Gilbert's research is primarily in problems of efficient computation with massive data sets. Her work includes analysis, probability, networking, and algorithms, with specific interest in randomized algorithms with applications to harmonic analysis, signal and image processing, networking, and massive data sets. Her research creates new mathematics and proves theorems, while at the same time applying these results to problems in the real world. The applications of her work to the development of superfast computer algorithms have been recognized internationally. In 2006, she received a Sloan Research Fellowship and an NSF Career award. Gilbert was an invited speaker at the International Congress of Mathematicians in Seoul, Korea in 2014. In 2012 she was selected as the National Academy of Sciences Kavli Fellow, and in 2013 she was awarded the Ralph E. Kleinman Prize from SIAM.

Gilbert is an outstanding teacher and has made essential contributions to the educational mission in applied mathematics. She has served as an advisor for graduate students and she has mentored several postdoctoral assistant professors. Gilbert is a founding member of the

interdisciplinary Informatics Program, which connects mathematics, statistics, and computer science.

The professorship is named for Herman H. Goldstine, a UM Mathematics faculty member from 1939 to 1948, who is considered a pioneer in the computer industry.

Jeffrey Lagarias has been named the Harold Mead Stark Collegiate Professor of Mathematics.



Lagarias attended the Massachusetts Institute of Technology where he completed his Doctorate in

1974 and began his career as a member of the technical staff at A. T. & T. Bell Laboratories that same year. When A. T. & T. split in 1995, he accepted an appointment as a technology consultant at A. T. & T. Labs Research and remained

there until 2004 when he joined the UM Mathematics faculty.

Lagarias' wide range of research interests have included papers in pure mathematics, applied mathematics, theoretical computer science, operations research, and mathematical physics. While specializing in number theory, he has made fundamental and substantial contributions to many different areas of mathematics. Specific areas he has investigated include algorithms and computational complexity, cryptography, discrete and computational geometry, dynamical systems, linear programming and optimization, low dimensional topology, mathematical physics, number theory, packings and tilings, quasicrystals, wavelets, fractals, and the $3x + 1$ problem.

Lagarias has more than 180 publications in refereed journals, 20 in conference proceedings, as well as 15 that are expository or surveys. He was named an ISI (Institute for Scientific Information) highly cited researcher and is one of the most sought after speakers both

nationally and internationally. He has received the Mathematical Association of America (MAA) Lester R. Ford award twice for expository papers, has given the MAA Earle Raymond Hedrick Lectures, and was the MAA George Polya Lecturer in 2012-2013.

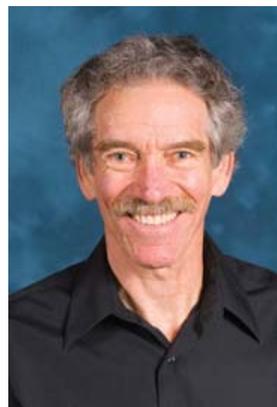
Known as an outstanding mentor and teacher, Lagarias runs a mathematics course aimed at introducing undergraduate students to mathematical research. He has been the advisor or co-advisor for nine Ph.D. students and currently has three Ph.D. students. Lagarias has served on the departmental Executive Committee, Personnel Committee, the Graduate Admissions Committee, and has run the undergraduate mathematics club several times.

Harold Mead Stark was a UM Mathematics faculty member from 1964 to 1969. A number theorist, Stark left UM for a position at M.I.T. until 1993, and afterwards joined the faculty of UC-San Diego. He was elected to the National Academy of Sciences in 2007.

Jeffrey Rauch Retires

Jeffrey Rauch, Professor of Mathematics in the College of Literature, Science, and the Arts, retired from active faculty status on June 1, 2015

After attending Harvard for his B.A., Rauch received his Ph.D. from New York University under the direction of Peter Lax. He joined the UM Mathematics faculty in 1971 as an assistant professor, and rose through the ranks, becoming a professor in 1983. During his tenure, Rauch served two one-year terms as chair of the Mathematics Department. He had many visiting appointments at institutions worldwide, and spent several semesters at the Università di Pisa, École Polytechnique (Paris), École Normale Supérieure de Paris, and L'Université de Paris Nord. On three occasions



he has been a visiting member of

the Institute for Advanced Studies at Princeton.

Rauch's research is in partial differential equations and their applications in Physics, with a concentration on hyperbolic equations. His most noted work is on control for hyper-

bolic partial differential equations, and nonlinear geometric optics. In the first area, joint with C. Bardos and G. Lebeau, they invented new techniques and new perspectives that shifted the center of the subject and remain crucial central ideas. His rigorous theory of nonlinear geometric optics is nearly a single handed creation with J.-L. Joly and G. Métivier. It is now a "classical" tool.

A prolific writer, Rauch has published 187 research papers and five books. He directed ten doctoral students, mentored many postdoctoral mathematicians, and was very active in undergraduate advising. He helped to develop several courses for the Department in applied mathematics, and was a popular teacher. Rauch served the university and mathematical community through numerous committees, administrative and editorial assignments, and chaired several external review committees for mathematics departments at European universities. He was recognized at the University level with a Faculty Recognition Award, an Excellence in Research Award, and was named an Outstanding Instructor by the Michigan Student Assembly. He is a fellow of the American Mathematical Society.

In his retirement, Rauch will continue to spend time in Paris, France, and his cabin in northern Michigan.

Faculty News



Bhargav Bhatt, the Gehring Associate Professor of Mathematics, was awarded a Packard Fellowship from the Packard Foundation. He is one of only 18 recipients nationally to receive a 2015 fellowship, which recognizes innovative early-career scientists and engineers and offers them the opportunity to experiment, take risks and explore new ideas that they otherwise may

not have the resources to do.

Professors Andreas Blass, Dick Canary, and Yongbin Ruan were named to the 2015 class of AMS Fellows. The Fellows of the American Mathematical Society program recognizes members who have made outstanding contributions to the creation, exposition, advancement, communication, and utilization of mathematics.

Professors Anthony Bloch, Liliana Borcea, and Thomas Lam are all recipients of 2015 Simons Fellowships. The fellowships provide funds to faculty for up to a semester long research leave from classroom teaching and administrative obligations. The goal of the Simons Fellows Program is to make it easier to take such leaves, or to extend sabbatical leaves by an extra half year. The Simons Fellowships are provided by the Simons Foundation.



Professor Selim Esedoglu will hold the Aisenstadt Chair at the Centre de Recherches Mathématiques (CRM) in Montreal from January-July 2016. This prestigious visiting appointment is in conjunction with a thematic semester on “Computational Mathematics in Emerging Applications” at CRM.

View from the Chair's Office

(continued from page 1)

Peter Smereka passed away this fall (see page 7). He was internationally renowned for his research in materials science and fluid dynamics, especially bubbly liquid flow. He was one of the founders of the AIM Ph.D. program, and directed it for several years. He had the office next to mine for many years, before I became Chair, and I will greatly miss his mischievous sense of humor. We are planning to have a new prize in his honor that will be awarded for a thesis in Applied and Interdisciplinary Mathematics.

Cuts in National Science Foundation funding and other federal agencies supporting mathematics continue to be troubling. Reductions in the number and duration of grants, as well as the level of funding, will continue to have a substantial effect on the availability of funds for inviting visitors, helping graduate students attend conferences and workshops, and other significant research opportunities. The University, College, and Department have, so far, done remarkably well in dealing with

the current conditions of economic adversity. I have written repeatedly that “The help of those who have supported the Department financially in these difficult times has never been more important.” Once again, I want to express my very great appreciation to those who have made contributions that are enabling the department not merely to survive but even to prosper despite these difficult times.

Professor Jeffrey Lagarias and coauthor Chuanming Zong of Peking University received the 2015 Levi L. Conant Prize from the American Mathematical Society for their article “Mysteries in Packing Regular Tetrahedra” (Notices of the AMS, December 2012). The Conant Prize recognizes the best expository paper published in either the Notices of the AMS or the Bulletin of the AMS in the preceding five years.

Assistant Professor Andrew Snowden has been recognized by the Sloan Foundation as a Sloan Research Fellow. The fellowships promote research by early-career scientists and scholars of outstanding promise. These two-year fellowships are awarded yearly to 126 researchers in recognition of distinguished performance and a unique potential to make substantial contributions to their fields.

Assistant Professor Shравan Veerapaneni received a 2015 NSF CAREER Award for his project “Fast Algorithms for Particulate Flows.” The CAREER awards are considered one of the highest honors for scientists and engineers in the early stages of their independent research careers, and recognize those who show great potential in their fields.

Promotions:

Lydia Bieri was promoted to Associate Professor and **Kartik Prasanna** was promoted to Professor.

Paul Kessenich was promoted to Lecturer IV.

Lecturer Appointments:

Hanna Bennett and **Scott Schneider** were appointed as Lecturer III. Both were formerly postdoctoral assistant professors in the Department.

James Peterson and **Daniel Visscher** were appointed as Lecturer I.

New Quant Masters Program

In 2015, the Department of Mathematics joint with the Department of Statistics launched a new interdisciplinary Master of Science degree program in Quantitative Finance and Risk Management. The program grew out of a need to address these burgeoning areas of mathematics that are in high demand in the financial industry. Previously, the College of Engineering administered a similar graduate program in Financial Engineering but stopped admitting new students in 2013. The new “Quant” program places a strong emphasis on mathematical and statistical theory while investing in career development opportunities outside the classroom. The program is directed by two long-time faculty members, Professor Erhan Bayraktar and Associate Professor Kristen Moore. Both have been with the Department’s Actuarial and Financial Mathematics program for many years. The Department is fortunate to have funding assistance for the program provided by a bequest from alumnus Jack Byrne (M.S. 1959).

The Masters program has two paths for students interested in advanced study in quantitative finance: a 3-term program for bachelor’s degree holders and an Accelerated Masters Degree Program (AMDP) for current UM undergraduates majoring in Financial Mathematics. The program focuses intensely on advanced mathematical and statistical methods. Graduates will have sophisticated quantitative skills that will prepare them to apply their knowledge to the solution of real world financial problems as quantitative analysts, risk managers, traders, developers, and other roles in the financial industry. The curriculum gives Quant students a thorough foundation in mathematical and statistical methods,

acquired through the completion of intensive core courses taught by faculty in the Mathematics and Statistics Departments. Elective courses in economics, finance, engineering, math, and statistics allow students to tailor their education to match their interests and career aspirations.

Though the program’s coursework focuses on mathematical and statistical theory, special emphasis is placed on career development. Quant students are expected to gain hands-on industry experience by completing a summer internship between the second and third semesters. Quant program staff assist students individually with their job searches and work with the Career Center, student organizations, and employers to connect students with opportunities. The program also hosts practitioner seminars, which offer Quant students an opportunity to hear about the career paths, day-to-day work, and perspectives on current issues of those currently working in the financial industry. Alumni interested in delivering a practitioner seminar are encouraged to contact the program (quantfinms@umich.edu) to learn more.

In Fall 2015, the program welcomed its first class of 18 students who hold undergraduate degrees in math, engineering, economics, and finance. The class includes one AMDP student from the undergraduate Financial Math program and one student completing a dual-degree in Applied Economics. Though the program expects a significant increase in applicants, the goal is to limit yearly cohorts to approximately 30 students. The smaller program allows students to form meaningful bonds with their classmates and faculty as they move through the curriculum together.

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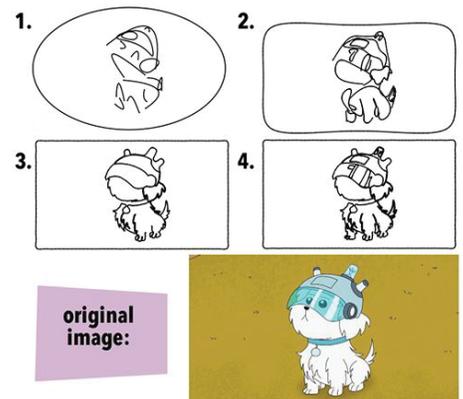
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www.lsa.umich.edu/math

Draw Anything App Wins MHacks

Math graduate students Olivia Walch and Matt Jacobs won first place in the 2015 MHacks competition for their Draw Anything mobile app. They created and programmed the app during a 36-hour period. The MHacks event was invented by the student organization MPowered to encourage entrepreneurship by challenging students to design, code, and build digital projects with commercial potential.

Draw Anything invokes the magic of math to offer step-by-step tutorials for how to draw any uploaded image. Using math and high-speed computations in the cloud, the app generates increasingly complex outlines of the image for an aspiring artist to follow.



To improve the accuracy of the drawings, Walch and Jacobs are working on optimizing the app’s edge detection capabilities—the first step in the app’s calculations, and a fertile field of applied math research that is necessary for things like medical imaging, self-driving cars, and automatically tagging friends’ faces in Facebook photos.

An app for iPhone, renamed SketchAnything, should be available in the App Store for free download in November 2015. The app won grand prize for a translator app at the HackNTU hackathon in Taiwan. It also won the Wolfram Technology prize at the most recent MHacks competition.

Donald J. Lewis 1926-2015

Donald J. Lewis, Professor Emeritus of Mathematics at the UM, passed away on February 25, 2015 at the age of 89. Born in Minnesota, to William and Eleanor Lewis, he was the oldest of eight children. He married Carolyn Dana Hauf in 1953 in Ann Arbor. He received his B.S. from the College of St. Thomas in 1946, and his M.S. and Ph.D. from UM, respectively in 1949 and 1950.



Lewis joined the University of Michigan faculty as an associate professor in 1961, and was promoted to full professor in 1963. He served as Chair of the Department of Mathematics at UM during the period 1984 to 1994, with a break for one year to visit the Institute for Advanced Study. He was also noted for his leadership in University affairs, and received numerous awards for his research and service, including a Distinguished Faculty Achievement Award from UM and an Alexander Von Humboldt Preis. Even after retirement from UM in 2000, Lewis was active in research and continued to work in the department on alumni relations and fundraising.

Between 1995 and 1999, Lewis was based in Washington, D.C. as the Director of the Division of Mathematical Sciences of the National Science Foundation. While at NSF, he championed multidisciplinary initiatives that paved the way for the applied and interdisciplinary mathematics programs that are thriving at universities around the country. Lewis also developed and promoted vertical integration of mathematical research at the university level. He was awarded the Distinguished Public Service Award of the American Mathematical Society in 1995 in recognition of his many contributions to mathematics research and education.

Lewis' research was in an area of Number Theory concerned primarily with Diophantine problems, and encompassed the theory of algebraic number fields and arithmetic geometry. While a number of his results have been improved in recent times, it is characteristic especially of his earlier work that he was the first to obtain any kind of result on a problem, and that this decisive progress cleared the way for subsequent developments. The work in his thesis concerning local solubility of cubic forms, however, remains definitive. Also noteworthy is a series of papers produced in a longstanding collaboration with Harold Davenport which laid the foundations for the investigation of a number of Diophantine problems, especially diagonal variants.

In 1966, Lewis authored the book "Introduction to Algebra" that utilized the art of M.C. Escher to help display mathematical concepts and illustrate the interplay between the two disciplines. He published two volumes of the book "Calculus and Linear Algebra" with UM colleague Wilfred Kaplan, which have recently been reprinted and used in courses at UM. He is the author of 58 research papers and a number of survey papers. The latter, in particular, have provided valuable stimulation to a generation of workers in this field. One of Lewis' main interests was the development of young mathematicians and he directed 24 doctoral theses. A more detailed obituary is available on the Math Department website.

Memorial contributions may be made to the Donald J. Lewis Professorship in Mathematics (571193), University of Michigan Department of Mathematics, 530 Church Street, Ann Arbor, MI 48109-1043. Online giving is available on the UM Leaders and Best giving site at <https://leadersandbest.umich.edu/tributes>.

C.-T. Shih 1934-2015

Chung-Tuo Shih, Professor Emeritus of Mathematics at UM, passed away on August 19, 2015 after persevering for 23 years through the challenges of Parkinson's disease. Shih received his B.A. degree from National Taiwan University in 1956 and his Ph.D. degree from the University of Washington in 1965. He joined the UM faculty as an assistant professor of mathematics in 1966 and was promoted to associate professor in 1971. He retired in 1999.

During most of his career, Shih worked in the area of probabilistic potential theory, otherwise known as the general theory of Markov Processes. This is an outgrowth of the surprising discovery that two quite distinct branches of physics, Brownian motion and Newtonian potential, have an intimate mathematical connection. Some of Shih's early publications have been described as among the deepest in the field and as marking a turning point in its development.

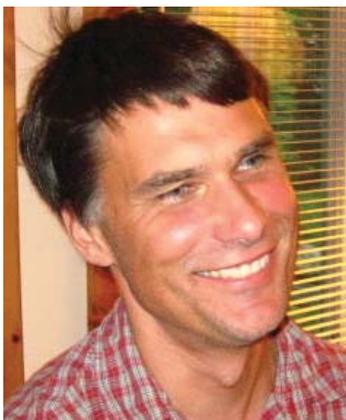
In his teaching, Shih concentrated his efforts on courses in probability at both the undergraduate and graduate levels and was responsible for several changes and developments in these courses. He also frequently taught first-year courses, particularly Math 116, and for many years was also the coordinator of this course. He served often on the Master's Committee and as an advisor to both undergraduate and Master's Degree students. He supervised one Ph.D. student and served on the Ph.D. committees of many others, both in mathematics and in statistics.

He is survived by his wife of 50 years, Ann; son Ping (Sarah); son Lo and grandson Xavier. His family was his joy, and his love of classical music and Michigan football followed him all of his days.

Peter Smereka

1959-2015

Peter Smereka passed away September 15, 2015, after suffering a heart attack. Born in Sault Ste. Marie, Ontario to Virginia and Edward Smereka, he was the first of four children. He attended Aurora High School in Aurora, Ontario (1974-1978) where he was valedictorian of his class. He participated very actively in Ontario science fairs, winning the Canada-wide science fair competition for three consecutive years.



In 1983, Smereka received his bachelor's degree in Physics from the University of Waterloo, Canada. He received his Ph.D. in Chemical Engineering from the University of California, Santa Barbara, in 1989. After visiting the Courant Institute of Math at NYU, and the Institute for Mathematics and its Applications, Smereka joined the faculty of the Department of Math-

ematics at the University of California, Los Angeles, in 1991 on an NSF postdoctoral fellowship.

Smereka came to the UM Mathematics Department in 1994 as an assistant professor. He was promoted to associate professor in 1997, and professor in 2003. He was also active as a member of the Michigan Center for Theoretical Physics. Smereka was an early and integral member of the Department's Applied and Interdisciplinary Mathematics (AIM) program, providing an important link with areas of engineering and the natural sciences. He served as director of the AIM program for several years. He received a prestigious NSF Career Award in 1996, and an Excellence in Education Award from the College of Literature, Science and the Arts in 1997. Smereka was one of the original developers and instructors of a new honors sequence for first-year science and engineering students. He served the Department through numerous committee assignments, undergraduate counseling, and research coordination.

Considered one of the leading applied and computational mathematicians of his generation, Smereka worked on a wide variety of problems, ranging from fluid dynamics to materials science. His early work had great effect on problems in "bubbly liquid flow" and he was widely regarded as the leading authority on this subject. His work on algorithms for multiphase flow—for example, for simulating the motion of two immiscible fluids and the surface that separates them—has been particularly influential. In that field, and more generally in the topic of interfacial motion, Smereka made fundamental

contributions. The algorithms he invented and helped develop are used in many branches of science and engineering. Many of his more than 60 research articles and numerous conference proceedings have had tremendous impact, and some are considered classics in their respective fields. In addition to being a leading authority in computational mathematics, applying his extensive knowledge of Physics and Engineering to mathematical modeling and computational simulation of physical problems, Smereka also excelled as an applied analyst, exploring the associated mathematical problems in great depth. In 2009, he was part of a team that received a patent for "a method for designing aerosol spray dispensers." During his career Smereka supervised six Ph.D. students and acted as a co-advisor for many others.

Smereka was always inquisitive and he provided a lot of humor, insight and thought-provoking questions for his family and colleagues over the years. He was an incredibly sensitive and kind person often running to help his family members when in need. Smereka loved to surf, hike, listen to jazz and eat street food, and play games. He also enjoyed golfing and swimming, and loved watching Stephen Colbert and Jon Stewart with his son Aidan. Smereka is survived by his wife Brenda, son Aidan, parents Ed and Virginia, sisters Karen and Susan, brother Robert and Aunt Joan, as well as many friends and colleagues from all over the world. He will be greatly missed by all. Memorial notes may be sent to math.mich@umich.edu.

Memorial contributions can be made to the Peter Smereka Memorial Graduate Student Fund, c/o the University of Michigan Department of Mathematics, 530 Church Street, Ann Arbor, MI 48109-1043, or online at <https://leadersandbest>.

Michigan Reception at the 2016 Joint Meetings

The University of Michigan Mathematics
Alumni and Friends Reception
at the 2016 Joint Mathematics Meetings
in Seattle will take place on

Thursday, January 7, 2016, 5:30 pm to 7:00 pm,

in the Virginia Room located on the 4th floor of the
Sheraton Seattle Hotel.

Please RSVP to math.mich@umich.edu.

All are welcome!

2015 Graduate Program Fellowships & Awards

A. W. Flint Memorial Scholarship

Jiaqi Li

Alice Webber Glover in Math Scholarship

Stefan Froehlich
Jake Levinson
Michael Newman
Wenling Shang
Jiah Song

Allen L. Shields Fellowship

Daniel Hathaway

Arthur Herbert Copeland, Sr. Memorial Scholar

Derek Wood

Barbour Scholarship

Zhibek Kadyrsizova

Cameron & John Courtney Scholarship

Francesca Gandini
Yining Lu
Alexander Munk

Carroll V. Newsom Scholarship

Amanda Bower
Sachi Hashimoto
Amy Nesky

G. Cleaves Byers Endowment

Patricia Klein

Gabrielle & Sophie Rainich Fellowship

Andrew Schaug

Juha Heinonen Memorial Graduate Fellowship

Rankeya Datta

Luther Claborn Mathematics Scholarship

Weichen Gu

Marjorie Lee Browne Scholars

Joseph Borja
Adrian Carballeira
Bryan Nevarez
Derrick Sund
Erick Vega
Ismael Xique

Mathematics Alumni/ Alumnae Scholarship

Daniel Irvine

Mathematics Department Graduate Fellowship

Siddhant Agrawal
Daniel Barter
Yuanyuan Chen
Laura Du
Dondi Ellis
Gabriel Frieden
Roman Gayduk
Alexandros Georgakopoulos
Kevin Hannay
John Holler
Han Huang
Trevor Hyde
Mathen Jacobs
John Kilgore
Joseph Kraisler
Xiaoyang Li
Bingying Lu
Robert Lutz
Viswambhara Makam
Audra McMillan
Rongxiao Mi
Takumi Murayama
Andrew O'Desky
Matthew Olson
Samantha Pinella
Huajie Qian
Ashwath Rabindranath
Elizaveta Rebrova
Emanuel Reinecke
Scott Rich
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Salman Siddiqi
Matthew Stevenson
Qingtang Su
Yitong Sun
Philip Tosteson

Alexander Vargo
Umang Varma
Olivia Walch
Feng Wei
Yun Wei
Hao Wu
Bowe Wu
Ming Zhang
Feng Zhu

National Physical Science Consortium Fellowship

Christopher Fraser

Natural Sciences and Engineering Research Council Fellowship

Jeremy Hoskins

National Science Foundation Fellow

Rachel Karpman
Suchan Pal
Robert Walker
John Wiltshire-Gordon

President's Challenge for Graduate Support

Grace Ingermanson

Proquest Distinguished Dissertation Award

June Huh

Rackham One-Term Dissertation Fellows

Setfan Froehlich
Weichen Gu
Wei Li
David Prigge
Wenling Shang

Rackham Outstanding GSI Award

Corey Everlove
Brooke Ullery

Rackham Science Award

Amanda Bower
Raymundo Navarrete
Amy Nesky
Andre Souza

Research Training Grant (RTG) – Algebra

Harold Blum
Brandon Carter
Charlotte Chan
Corey Everlove
Daniel Hathaway
Adam Kaye
Alexander Leaf
Rohini Ramadas
Ariel Shnidman
Brooke Ullery

Research Training Grant (RTG) – Geometry

Gene Kopp
David Renardy
Russell Ricks
Brandon Seward
Robert Silversmith

Sumner B. Myers Memorial Prize

June Huh
Mary Wooters

The Department of Mathematics Outstanding Teaching Award

Pedro Acosta

The Karen Rhea Excellence in Teaching Award

Charlotte Chan

The Mort Brown Excellence in Teaching Award

Brandon Carter

The Pat Shure Excellence in Teaching Award

Juan (Felipe) Perez

The Wirt & Mary Cornwell Prize in Mathematics

Brandon Seward

2015 Doctorate Degrees

Pedro Acosta completed his dissertation “*A General Landau-Ginzburg/Gromov-Witten Correspondence*” under the direction of Yongbin Ruan. He is a Dunham Jackson Assistant Professor at the University of Minnesota.

David Benson-Putnins completed his dissertation “*Volumes and Integer Points of Multi-Index Transportation Polytopes*” under the direction of Alexander Barvinok. He is an Assistant Trader with Jane Street Capital.

Andrew Brouwer completed his dissertation “*Models of HPV as an Infectious Disease and as an Etiological Agent of Cancer*” under the direction of Marisa Eisenberg. He is a postdoc research fellow in the UM Department of Epidemiology.

Daniel DeWoskin completed his dissertation “*Multiscale Modeling of Coupled Oscillators with Applications to the Mammalian Circadian Clock*” under the direction of Daniel Forger. He is an Arthur J. Krener Assistant Professor at UC Davis.

Brittan Farmer completed his dissertation “*Modeling and Simulation of Carbon Nanotube Growth*” under the direction of Selim Esedoglu. He will be a Postdoctoral Fellow at the University of Minnesota.

Balin Fleming completed the dissertation “*Arc Schemes in Logarithmic Algebraic Geometry*” under the direction of Karen Smith. Balin will be a Postdoctoral Fellow at the University of British Columbia.

Purvi Gupta completed her dissertation “*Fefferman’s Hypersurface Measure and Volume Approximation Problems*” under the direction of David Barrett. She will be a Postdoctoral Fellow at the University of Western Ontario.

Daniel Hathaway completed his dissertation “*Domination of Functions*” under the direction of Andreas Blass. He will be a Visiting Assistant Professor at the University of Denver.

Zhibek Kadyrsizova completed the dissertation “*Tight Closure, F -Purity, and Varieties of Nearly Commuting Matrices*” under the direction of Mel Hochster.

Giwam Kim completed the dissertation “*Richardson Varieties in a Toric Degeneration of the Flag Variety*” under the direction of David Speyer.

Juan Perez completed his dissertation “*On Connections Between Invariants of Singularities in Zero and Positive Characteristics*” under the direction of Mircea Mustata.

Russell Ricks completed his dissertation “*Flat Strips, Bowen-Margulis Measures, and Mixing of the Geodesic Flow for Rank One $CAT(0)$ Spaces*” under the direction of Ralf Spatzier. He will be a Visiting Assistant Professor at Binghamton University.

Brandon Seward completed his dissertation “*Krieger’s Finite Generator Theorem for Ergodic Actions of Countable Groups*” under the direction of Ralf Spatzier. He will be a Postdoctoral Fellow at Hebrew University of Jerusalem.

Ariel Shnidman completed the dissertation “*Heights of Generalized Heegner Cycles*” under the direction of Kartik Prasanna. Ariel will be a Visiting Assistant Professor at Boston College.

Yi Su completed the dissertation “*Electrical Networks and Electrical Lie Theory of Classical Types*” under the direction of Thomas Lam.

Brooke Ullery completed her dissertation “*Tautological Vector Bundles on the Hilbert Scheme of Points and the Normality of Secant Varieties*” under the direction of Karen Smith. She will be a NSF Postdoctoral Fellow at the University of Utah.

Alfredo Wetzel completed his dissertation “*Three Stratified Fluid Models: Benjamin-Ono, Tidal Resonance, and Quasi-Geostrophy*” under the direction of Peter Miller. He will be a Van Vleck Visiting Assistant Professor at the University of Wisconsin.

Yuchong Zhang completed the dissertation “*Problems in Mathematical Finance Related to Transaction Costs and Model Uncertainty*” under the direction of Erhan Bayraktar. Yuchong will be a limited term Assistant Professor at Columbia University.

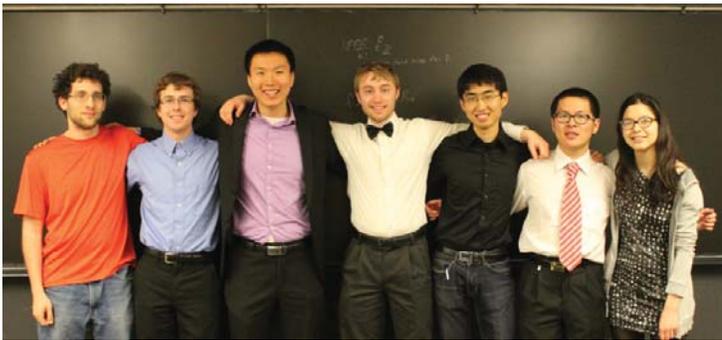
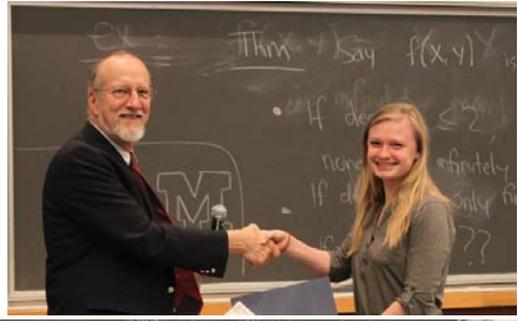
Tengran Zhang completed the dissertation “*Degeneration of Hitchin Representations*” under the direction of Dick Canary. Tengran will be an Olga Taussky-John Todd Instructor at the California Institute of Technology.

Xiaolei Zhao completed the dissertation “*Topological Abel-Jacobi Mapping and Jacobi Inversion*” under the direction of Karen Smith. Xiaolei will be a Postdoctoral Research Instructor at Northeastern University.

Zhou Zhou (left) completed the dissertation “*Topics in Optimal Stopping and Fundamental Theorem of Asset Pricing*” under the direction of Erhan Bayraktar. Zhou will be a Postdoctoral Fellow at the Institute of Mathematics and its Applications at the University of Minnesota.



Awards Ceremony & Graduation Ceremony



Top row, l-r: Stephen Debacker presents the Bychinsky award to Kai Fang; Mel Hochster presents the Michigan Mathematics Merit Scholar award to Ryen Krusinga; Chip Levy presents the Lois Zook Levy award to Heather Price. Second row, l-r: Bhargav Bhatt presents the LeVeque award to Karl Winsor; some recipients of the Bychinsky award. Third row, l-r: Stephen Debacker presents the Outstanding Achievement in Mathematics award to Jacob Light's mother (Jacob was off backpacking the world); Roger Natarajan presents the Richter award to Joseph Kropiewnicki. Fourth row, l-r: A group of happy graduates; graduate Aizhan Mukasheva with faculty member Joe Marker. Bottom row: Some recipients of the Outstanding Achievement in Mathematics award.

2015 Undergraduate Awards

Putnam Competition

The Department's team for this year's William Lowell Putnam Competition placed 11th out of 431 teams. The members of the team were **Hai Tran Bach**, **Wei Chen** and **Joseph Richey**. In the individual competition, **Joseph Richey** and **Hai Tran Bach** finished in the top 100 out of more than 4300 students.

In the 32nd Annual University of Michigan Undergraduate Mathematics Competition **Raghav Prabhu** and **Hai Tran Bach** tied for first place, and **Joseph Richey** placed third.

Evelyn O. Bychinsky Awards

recognizing underclass students who show exceptional promise in mathematics:

Kai Fang
Youssef Katamish
James Lawniczak
Alexandra Meilhac
Moise Mouyebe
Raghav Prabhu
Aman Sharma
Carsten Sprunger
Samuel Tenka
Jessica Thompson
Xige Zhang
Wenli Zhao

Leon P. Zukowski Prize

recognizing outstanding service in the Mathematics Learning Center:

Xin Xu

Mathematics Alumni/Alumnae Scholarship

Yichuan Wang

Wilfred Kaplan Award in Applied Mathematics

Jonathan Haefner

William LeVeque Award in Number Theory

Karl Winsor

Jack McLaughlin Award in Algebra

Gwyneth Moreland

Sumner B. Myers Award in Analysis

Wenli Zhao

Outstanding Achievement in Mathematics Awards

Wei Chen
Karthic Epker
Bohan Huang
Zhuangdi Li
Xinyuan Li
Jacob Light
Kara Martinez
Nicholas Nuechterlein
Xiaozhou Pu
Caleb Springer
Feng Wang
George You

Otto Richter Memorial Prize in Actuarial Science

Joseph Kropiewnicki

Irving Wolfson Award

Junrong Wang



Lois Zook Levy Award

recognizing an outstanding mathematics student who plans to pursue a career in K-12 mathematics education:

Heather Price

Michigan Mathematics Merit Scholar

Ryen Krusinga
Noah Shuttly
Shiqing Yu
Abylay Zhexembay

Outstanding Graduating Senior

Zhongyi Zhang

Wirt and Mary Cornwell Prize in Mathematics

Karl Winsor

Other National Awards

AFCEA STEM Teacher Scholarship:
Heather Price

Waldemar J. Trjitzinsky Memorial Award from the AMS:
Kristen Amman

Goldwater Scholarships for STEM:
Jonathan Haefner and Karl Winsor



Diversions available for students in the Math Department atrium include a ping pong table, a piano, and a recently acquired foosball table.

Actuarial Program Highlights

It always feels good if someone from the outside says we are good. I am happy to inform you that the Society of Actuaries (SOA) reaffirmed our Center of Actuarial Excellence status until the year 2020. We are very proud of our faculty, the program, and the students, and will consider the important feedback we received from the SOA to strengthen our actuarial program and faculty. I am sure Professor Curtis E. Huntington would be very pleased that we are maintaining the very high standards that he helped to develop.

We are very fortunate that Professor Huntington formed the Actuarial Alumni Leadership Council (AALC) consisting of highly recognized actuarial leaders who are UM alumni, from whom we continue to seek guidance and support. This year Sam Gutterman and Roosevelt Mosley accepted our invitation to join AALC.

Our programs in Actuarial and Financial Mathematics are extremely popular and continue to thrive. Approximately 300 students have declared majors in Actuarial and Financial Mathematics; they comprise about 54% of the total number of undergraduate mathematics majors. Moreover, we have ten Masters students focusing on Actuarial Mathematics.

During the academic year 2014-15, a record number of 91 students received actuarial exam subsidies. We also significantly simplified and improved our exam subsidy policy. After passing an actuarial exam, the student is eligible to get the exam subsidy (100% of fees) without any limitation on the number of subsidies a student can receive in an academic year. Our students are well-recruited by employers. In 2014-2015, representatives from 36 companies visited campus to recruit our students for full-time positions and summer internships. Moreover, our students visited four companies at their headquarters.

Our student-run club, Student Actuaries at Michigan (SAM), is one of the more active academically-focused groups on campus. Last year, there were approximately 120 dues-paying members, and there are about 517 people in the Facebook group. SAM activities include résumé and interview workshops, campus visits from and field trips to prospective employers, outreach to local high schools to promote the actuarial profession, intramural sports, and social events.

In May 2015, we held the Thirteenth Annual Actuarial Commencement Luncheon, which is a high point of the academic year. In 2003, Professor Huntington named this event the Nesbitt Commencement Luncheon to honor his friend and mentor, Cecil Nesbitt, who was a leader of the actuarial faculty here for 63 years. In 2014, we renamed the event the Nesbitt/Huntington Commencement Luncheon. Over 150 people attended, including graduating seniors, their families, and the faculty. We celebrated the graduates' accomplishments with a catered lunch, and our commencement speaker was Michael

J. Cowell (B.A. 1959). Mr. Cowell started his career at State Mutual Life Insurance Company, in Worcester, MA, where he progressed to the position of Chief Actuary. Subsequently he joined UNUM Life Insurance Company as Corporate Actuary. He retired in 1998. Mr. Cowell knew Professors Nesbitt and Huntington for a combined total of 100 years!

While we have had the well-established student club SAM for many years, we have not had the same for students who major in Financial Math. I am very pleased to announce that seven students who are majoring in Financial Math decided to form a student club MFAMS (Michigan Finance And Mathematics Society). The inaugural meeting was attended by more than 150 students. Ally Insurance was the first employer to address our students. For more information about MFAMS, please visit: <https://maizepages.umich.edu/organization/MFAMS>

In October 2015, we were the hosts for the Third Annual Midwest Actuarial Students Conference (MASC), which was attended by more than 300 people (students, faculty, employers, and sponsors). The theme of this year's conference was to educate the students about how best to capitalize on future job opportunities in building their actuarial professional career.

Please consider joining the LinkedIn group University of Michigan Actuaries as a way to network and keep in touch with fellow alumni/ae. Also, you can update your University of Michigan directory information at https://leadersandbest.umich.edu/alumni_update/

This communication is just to highlight some of the activities that are taking place in your alma mater. I plan to send separate detailed descriptions on each one of the important events in the future.

We would love to hear from you if you have comments, questions, or suggestions. If your travels bring you to Ann Arbor, please pay us a visit in East Hall.

B. Roger Natarajan, Phd, FSA
Actuarial Program Director



A SAM member presents to the AALC in September 2015.

Alumni Updates

James Ward Brown (M.A. 1958, Ph.D. 1964) is professor emeritus of mathematics at UM Dearborn. His book “Complex Variables and Applications” with the late UM faculty Ruel V. Churchill, just appeared in its 9th edition.

Roger “Si” Simonsen (M.S. 1960) retired from Boeing as the head of advanced technology assessment.

Bruce Vanderporten (B.A. 1963) retired from Loyola University Chicago, where he was a math professor.

Carolyn Harris Tews (B.A. 1965) retired from Schoolcraft College, where she was a math professor.

Teresa Peterson (B.S. 1967, M.A. 1968) retired from River Falls School District (WI) where she was a math and physics teacher. She is currently teaching algebra and trigonometry at Gogebic Community College Houghton Center.

Alan Shuchat (Ph.D. 1969) received his degree under M.S. Ramanujan (Ram) in functional analysis. He taught at the University of Toledo and Mount Holyoke College, before going to Wellesley College in 1974. He retired from Wellesley in June 2015. Shuchat’s most recent research with other Wellesley faculty involved questions in graph theory, using methods from operations research. He also worked with a colleague on developing software to make Mathematica more friendly for teaching, and served stints as Associate Dean and Department Chair. In retirement he hopes to have more time for other interests, such as languages, genealogy, and music, including playing Baroque and klezmer music on recorder, harpsichord, and melodica, and learning to play jazz piano.

Michael Frank (B.S. 1987) is president of Aquarias Capital in New York. He is also a professor at Columbia University, and recently joined the board of directors of the Healthcare Research Foundation.

Alexander Villacorta (Ph.D. 2000) is Vice President of Research & Analytics at Clear Capital, Inc. in Reno, NV. Alex, his wife Tanya Vega, and children Olive and Otis are pictured at right in their (non-math) Michigan gear.

Mihran Papikian (Ph.D. 2003) is an associate professor at Penn State University.

Christopher Hankinson (B.S. 2007) is the assistant vice president and actuary for MetLife’s Group, Voluntary & Worksite Benefits Underwriting organization for the Southeast region located in Atlanta, GA. This organization underwrites group life, accidental death and dismemberment, disability, dental, vision and voluntary benefits, including accident and health, and critical ill-



Math Teachers’ Circle

This past August, after a year of planning and recruitment, the UM Math Department kicked off a new mathematics program for teachers called the Wayne County Math Teachers’ Circle. The Circle brings together mathematics teachers and mathematicians once a month for in-depth, collaborative problem-solving, and discussions about teaching. Through regular attendance and participation, the aim of the Circle is to create a tight-knit professional community of mathematical learners. Through this social structure and well-posed, novel problems the goals are to: build teachers’ mathematical problems-solving skills, support teachers’ use of mathematical problem-solving and math practices in the classroom, and increase participants’ enjoyment of mathematics and productive attitudes towards learning and teaching mathematics.

After a full-day immersion in August, the Circle has met twice, in September and October. Over 40 teachers have been involved so far, with more than half of them coming from the Detroit Public Schools. The Circle continues to attract new participants through strong relationships with Wayne Regional Educational Service Agency (RESA) and the Detroit Area Council of Teachers of Mathematics (DACTM). More than a dozen mathematicians have come to participate, most of them multiple times, including graduate students, post-docs, lecturers, and professors. Besides the monthly meetings, the Circle has also gone “on the road,” running problem-solving activities at two state math teachers’ conferences in the past year.

Sponsors who provided initial funding for this program include DACTM, the American Institute of Mathematics, the Mathematical Sciences Research Institute, and the UM Math Department’s Inquiry Based Learning Center. Additional information about this exciting and innovative program is available on the website www.math.lsa.umich.edu/WCMTC.

ness. In this role, Hankinson is responsible for evaluating the risk of group businesses and setting profitable pricing for both new and inforce U.S.-based employers with 5,000 or more employees. He assumed this position in January 2015.

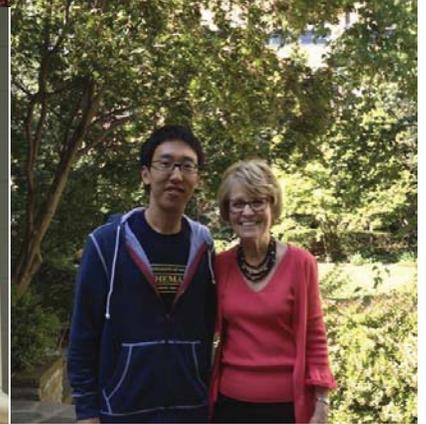
Alex Riley (B.S. Math & IOE, 2011) was recently selected as the 2015 Young Entrepreneur of the Year by the Michigan District Office of the Small Business Administration, and one of his companies, MeritHall, ranked number 165 on the INC. 500 list of fastest growing private companies in America.

Where's Your Math T-shirt Been?

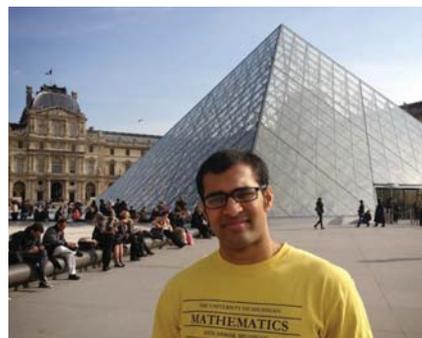


Top row, l-r: Jose Gomez in Hong Kong; Perkins Pedrick (1960); Bob Nelson (1975) cruising the Rhine Valley. Second row l-r: Carsten Sprunger (2017) at Point Pelee; Lulu Wang (2016) with some feathered friends; Arman Hemmati in Colorado. Bottom row, l-r: Kasev Vyas at St. Basil's in St. Petersburg; Karl Winsor (2016) pictured with his fellow action stars. For information on ordering your own Mathematics Department t-shirt, contact math.mich@umich.edu.

Where's Your Math T-shirt Been?



Top row, l-r: Katsuyo Thornton, Kelli Talaska (2010), Martin Strauss, Eli Sherman, Shayna Mason (2016) at Washington University St. Louis; AMS staff members in Providence, RI. Second row, l-r: Chuin Siang Bu (2011) in Himachal Pradesh, India; Pat Shure at the University of Havana, Cuba; Cong Zhang (2015) with Mary Sue Coleman. Third row, l-r: Salvatore Parenti III (2014), Elliot Wells (2014), David Bruce (2014) at the Ingalls Mall Fountain; Lillian Huang (2018) in Lanzhou, China; Heather Price (2016) in Queenstown New Zealand. Bottom row, l-r: Keng Yang Phua (2008), Pei Ying Goh (2009), Siew Gee Lim (2009) in Yellowstone; Alex Carney (2012), Ruthi Hortsch (2011), Nicholas Triantavillou (2013) in Arizona; Rohan Joshi (2013) at the Louvre.





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University of Michigan Degree(s) with years & advisors _____

Degrees from other Universities/Years _____

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City, State Zip _____

Home Phone _____ E-mail _____

Firm/Institution _____

Position _____ Business phone _____

Information about yourself or comments on the newsletter: (unless you request otherwise, we may mention any of this in future newsletters)
Check here if you do NOT want this published in the next ContinuUM

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