A Timeline of Mathematics at Michigan

As the University celebrates its Bicentennial, we share some highlights of the history of Michigan Mathematics. The University has extensive information on all aspects of its history available at: bicentennial.umich.edu/our-history/

A more detailed account of the Mathematics Department history with additional information is available on our website in the history section: lsa.umich.edu/math/about-us/history

August 26, 1817: The University is founded in Detroit as the Catholepistemiad, or University of Michigania, by Augustus Woodward, Rev. John Monteith and Rev. Gabriel Richard.

1835: Michigan voters ratify a state constitution that includes support for a state university.

1837: Ann Arbor is selected by the Michigan Legislature as the home of the University, prompting a move from Detroit.

September 25, 1841: University first offers classes. There are seven students and two professors, Reverend George P. Williams teaching mathematics and science, Reverend Joseph Whiting teaching Greek and Latin. The College of Literature, Science, and the Arts is established as the first college of the University.

1854: There are 63 freshmen. The Mathematics curriculum covers algebra, geometry (Legendre), trigonometry, analytic geometry, and calculus.

1877: There is a staff of five. Curriculum expands slightly to include topics such as quaternions, calculus of variations, calculus of finite differences.

1887: There are courses on projective geometry and theory of functions, including elliptic functions.

1888: **Alexander Ziwet** (right) and **Frank N. Cole** join the department. Ziwet remained until 1925 and was a major influence. Both Ziwet and Cole were much involved with formation of the American Mathematical Society (AMS). The department's Mathematics Club began before 1891 in Ziwet's parlor.
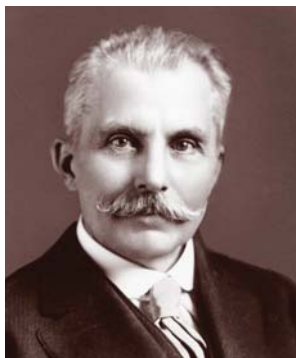
View From the Chair's Office
Anthony Bloch

I am looking forward to my second term as Chair of our outstanding Department of Mathematics here at the University of Michigan. The department has been ably steered by Mel Hochster these past nine years, and I would like to thank Mel for his service and for being so very helpful to me during the transition period. Mel has done a superb job, and we all appreciate his hard work and the many things he accomplished for the department.

I will strive to continue our tradition of excellence, and I am indeed fortunate to have the assistance of many wonderful faculty members. I want to thank my Associate Chairs: **Andreas Blass**, **Dick Canary**, **Kristen Moore**, and **Karen Smith**, as well as **Ralf Spatzier**, the head of the Personnel Committee, and all the other members of the department who have agreed to serve in various capacities. And I really want to say a heartfelt thank you to **Doreen Fussman**, our Chief Administrator, and her extremely capable staff, all of whom are absolutely essential to the smooth functioning of our department.

Our faculty include outstanding pure and applied mathematicians, many of whom practice in both areas. We are fortunate to have **Erhan Bayraktar** in charge of our financial program, **Roger Natarajan** as actuarial program director, **Charlie Doering** at the helm of Complex Systems, **Silas Alben** as AIM Program director, and **John Schotland** in control of MCAIM, the new Michigan Center for Applied and Interdisciplinary Mathematics.

Sadly, one of our long-time faculty members, **Joel Smoller**, recently passed away. Joel, who was central to our Partial Differential Equations program, was a great asset to the department over many years. Please find the article honoring his life and his achievements on page 4. Joel will be missed.

Our department is highly regarded both because of the

Faculty News

Associate Professor Lydia Bieri and co-authors David Garfinkle and Nicolás Yunes, have a featured article on Gravitational Waves in the August edition of the Notices of the American Mathematical Society. This is the last part of the two-part series. The article is available at www.ams.org.

Gavin LaRose has been named the Karen Rhea Collegiate Lecturer beginning with the 2017-2018 academic year. Collegiate Lecturers are chosen based on their sustained record of excellence in teaching and learning and/or in service or other contribution to the University.

Professor Liliana Borcea was named the 2017 Sonia Kovalevsky Lecturer by the Association for Women in Mathematics (AWM) and the Society for Industrial and Applied Mathematics (SIAM). The lectureship is awarded to anyone in the scientific or engineering community whose work highlights the achievements of women in applied or computational mathematics.

Assistant Professor Sergey Nadtochiy has received a Career Award from the National Science Foundation for his project "Quantitative Approach to Large-population Stochastic Dynamic Games." Career awards are the NSF's most prestigious awards in support of early-career faculty who have the potential to serve as academic role models in research and education and to lead advances in the mission of their department or organization.

Assistant Professor Wei Ho has been selected by the Alfred P. Sloan Foundation as one of the recipients of a 2017 Sloan Research Fellowship. These fellowships recognize early-career scholars who represent the most promising scientific researchers working today, whose achievements and potential place them among the next generation of scientific leaders in the U.S. and Canada.

Professor Igor Kriz has been elected to the Learned Society of the Czech Republic. Established in 1994, the Learned Society is an association of distinguished scholars of the Czech Republic. Its main goal is to support free conduct of research and furtherance of scientific knowledge.

2017 Simons Fellows

Three faculty members have received prestigious Simons Fellowships in 2017. **Anna Gilbert**, **Mark Rudelson**, and **Sijue Wu** were three of the 40 mathematicians to receive fellowships, which provide funding for up to a semester long research leave. **Gilbert** studies analysis, probability, discrete mathematics, and algorithms with applications to harmonic analysis, signal and image processing, and massive datasets. **Rudelson's** research is in analysis and probability, with focus on asymptotic geometric analysis, high-dimensional probability, and convex geometry. **Wu** studies nonlinear partial differential equations (PDEs) from fluid dynamics, including Euler equations, the vortex sheets, water waves and singularities.

Gopal Prasad Retires

Gopal Prasad, the Raoul Bott Collegiate Professor of Mathematics, retired from active faculty status on May 31, 2017

Professor Prasad received his Ph.D. in Mathematics from the University of Bombay, India, in 1976. In 1975 he got tenure at the Tata Institute of Fundamental Research, and was named a Professor there in 1984. He was appointed a Professor of Mathematics at the University of Michigan in 1992, and in 2008, he was named the Raoul Bott Collegiate Professor of Mathematics. Professor Prasad's numerous visiting appointments have included stays at Yale University and the Mathematical Sciences Research Institute, Berkeley. He has been a many-time member of and frequent visitor to the Institute for Advanced Study in Princeton.

Considered a leading expert on Lie groups and algebraic groups, Professor Prasad has done ground-breaking research with many collaborators. In his early work, he proved the strong rigidity of lattices in real semi-simple groups of rank 1 and also of lattices in *p*-adic groups, and later studied the topological central extensions of these groups, and computed the metaplectic kernel for isotropic groups. Professor Prasad and A. Rapinchuk gave a precise computation of the metaplectic kernel for all simply connected semi-simple groups. He proved a useful volume formula for semisimple groups, and with UM colleague Allen Moy, worked on the representation theory of reductive *p*-adic groups, developing the "Moy-Prasad filtration" of parahoric subgroups. In recent work with B. Conrad and O. Gabber, Professor Prasad has given a classification of and structure theory for non-abelian pseudo-reductive groups over all imperfect fields. This work settles an outstanding problem in the area and has several important arithmetic applications.

From 1998 to 2011, Professor Prasad was the managing editor of the Michigan Mathematical Journal, during which time he broadened the editorial board to include mathematicians from around the world, and significantly enhanced the Journal's stature. He was an associate editor for the Annals of Mathematics for 6 years. He served on many departmental and University committees, and chaired the department's Library Committee for many years. Professor Prasad was recognized with a Guggenheim Foundation Fellowship in 1998 and a Humboldt Senior Research Award in 2006. He was a devoted teacher of both undergraduate and graduate courses, directed 4 Ph.D. students, published 3 research monographs, and had more than 60 research papers and 7 collaborators.

Notes from the Chair

caliber of our research and our teaching. To maintain our well-earned reputation for excellence, I will work to retain our current accomplished faculty and to recruit other first-rate faculty to replace those pirated by other departments and those who have retired.

We are continually improving our teaching methods as demonstrated by our innovative much admired calculus program and our center for Inquiry-Based Learning directed by Ralf Spatzier. Also, we continue to reach out to the community through the Michigan Math and Science Scholars summer program, as well as our Math Circle program for middle and high school students and teachers. Our teaching program depends on the hard work of our faculty, post-docs, and graduate student instructors. The department is always a hub of activity because we run an exceptional colloquium and seminar program.

We were extremely happy to welcome back UM Ph.D. alumna, **Chelsea Walton**, as the 2017 Marjorie Lee Browne Colloquium speaker. Her talk "Math in the Age of Trump," attracted a standing-room-only crowd on Martin Luther King Day. Chelsea shared some of her personal experiences navigating the world of research mathematics as a woman of color.

The speaker for the 2018 Marjorie Lee Browne Colloquium will be **Rudy Horne** from Morehouse College. Rudy will talk about his experiences as the main mathematics consultant for the recent movie, "Hidden Figures." If you will be in the Ann Arbor area on Martin Luther King Day, please join us for this exciting talk. You can find all the details on our website.

The Michigan Bicentennial Lecture in February, presented by **Stephen Smale**, was entitled "Some Perspectives on Mathematics and Applied Mathematics." Smale, who is a Field's Medalist, received his undergraduate degree as well as his Ph.D. in Mathematics from UM. He reminisced about his time at the university which was between 1948 and 1956, and he highlighted his current research with members of the UM Department of Computational Medicine and Bioinformatics.

We are looking forward to the visits of **Nazir Touzi** as our inaugural Van Eenam Lecturer, **Richard Taylor** as the 2018 Rainich Lecturer, and **Gunther Uhlmann** as the 2018 Ziwet Lecturer. The math department will host an AMS sectional meeting in the fall of 2018.

I am looking forward to a successful and productive year.

Joel Smoller
1936 - 2017

Joel Smoller, 81, passed away September 27, 2017, after a prolonged illness. He was born and raised in Brooklyn, the son of a New York City taxi driver. Despite the hardship of losing his mother at an early age, and with the support of his extended family, he pursued academics in the public schools. He found his love of math in his first geometry course in high school, and then never waivered in his desire to become a mathematician. He attended NYU for his undergraduate degree, and Purdue for his PhD in 1963.

His first and only academic appointment was at University of Michigan Department of Mathematics. His 54 year career here began in 1963 as an instructor. Smoller was promoted to professor in 1970, and was named the Lamberto Cesari Collegiate Professor of Mathematics in 1998. He retired from active faculty status in June, 2017. Smoller's long and prestigious academic career includes supervising 28 graduate students and mentoring many postdoctoral faculty, producing more than 180 publications in association with 34 co-authors, and teaching hundreds of undergraduate and graduate students.

Smoller specialized first in partial differential equations, but his research regularly grew into different fields as a new passion took hold. He conducted research in shock-wave theory; Navier-Stokes equations; systems of reaction-diffusion equations; stellar dynamics; dynamical systems (Conley Index Theory); and bifurcation theory (symmetry-breaking bifurcations). He pioneered the analysis of numerical difference schemes for conservation laws in several space dimensions, introduced new topological methods to the analysis of partial differential equations, and was fundamental in establishing the shock structure problem in mathematics. Many of his early results have been influential in mathematical biology. Smoller's more recent research concerned Stability of Kerr (rotating) Black Holes under various perturbations such as scalar waves, Dirac Fields, electromagnetic waves, and gravitational waves; and astrophysical shock-waves, concerned with astrophysical problems including an explanation of the anomalous acceleration of the Universe, wholly within Einstein's equations of General Relativity and avoiding the cosmological constant, and the notion of dark energy. His book, "Shock Waves and Reaction—Diffusion Equations" became the standard in that area and has been a reference in programs worldwide.

During his career, Smoller received significant recognition for his scholarly activities including a Guggenheim Fellowship in 1980, the Margaret and Herman Sokol Award in 1992, and an Excellence in Research Award in 1996. More recently he was named a senior Humboldt Fellow, and received the prestigious G.D. Birkhoff Prize in Applied Mathematics from AMS/SIAM in 2009.

Smoller is survived by his wife Margaret, children, Debbie, Alex (Lisa Mitchell), and Sally; his stepchildren Anne Dickinson (Patrick) and David Arditti; his granddaughter, Arcadia Mitchell; his brother Howard, and his many friends, coauthors, and colleagues here and abroad.

To carry on Smoller's tradition of supporting and mentoring young mathematicians, memorial contributions can be made to the Joel Smoller Fellowship Fund in the Department of Mathematics (fund #700262). Contributions can be sent via mail to the UM Department of Mathematics, 530 Church Street, Ann Arbor, MI 48109-1043 (checks to University of Michigan), or online at the following link: http://victo.rs/2y3Yohi.

Math Timeline

1895: **James W. Glover** joins the faculty, remaining until 1937. He developed a strong program in actuarial mathematics. He served as chair from 1926 until 1934.

1900: **Walter B. Ford** joins the department. He wrote on asymptotic series and summability theory, wrote textbooks and strengthened the curriculum.

1901: Beginning of a separation of mathematics instruction for engineering students, with Alexander Ziwet in charge. This lasted until 1928 and led to mathematics offices in successive engineering buildings.

1908: The department has grown to 20 faculty. The curriculum includes Fourier series and spherical harmonics, ordinary and partial differential equations, theory of substitutions, theory of numbers, theory of invariants, potential theory, courses for teachers.

1909: **Theophil H. Hildebrandt** joins the department, to remain until 1957, serving as chair from 1934 to 1957. He was the first recipient of the Chauvenet Prize of the MAA and was President of the AMS in 1945-1946. He was honored by the T. H. Hildebrandt Assistant Professorships in the department.

1911: First PhD was granted in the department. The recipient was **W. O. Mendenhall**, who wrote on divergent series under Ford. By 1941, 90 PhDs had been granted.

1922: **Ruel V. Churchill** joins the faculty, to remain until 1966. He did much for the applied mathematics program and had wide influence through his books on applied analysis.

1926: **George Y. Rainich** and **Raymond L. Wilder** join the department, to remain until 1956 and 1968 respectively. Both did much to strengthen the department, particularly by introduction of more seminars and colloquia.

New Funds Offer Great Opportunities

1930-1940: The following entered the department: **Robert C. F. Bartels** in applied mathematics, who later became the first director of the University's Computing Center; **Herman H. Goldstine**, in functional analysis, who later worked with von Neumann in developing the digital computer; **Sumner B. Myers**, in differential geometry and functional analysis; **Cecil J. Nesbitt** in algebra and actuarial mathematics, and **Robert M. Thrall** in algebra.

1940-1945: The years of World War II had a major impact on the University. Enrollments were greatly reduced and some faculty took leave for military research. Several faculty joined the department: **George E. Hay** in applied mathematics, who later became chair in 1957-1967; **Erich Rothe**, in functional analysis; **Samuel Eilenberg** and **Norman Steenrod,** who made major contributions to topology.

1945-1950: **Richard Brauer** in algebra, **William J. LeVeque** in number theory, **George Piranian** and **Maxwell Reade** in complex analysis, **Phillip Jones** in history of mathematics, and **Hans Samelson**, in topology and geometry, enter the department. LeVeque was chair from 1967 to 1970.

1950-1960: **Frederick Gehring,** in complex analysis, **Lamberto Cesari**, in calculus of variations, and **Roger C. Lyndon**, in algebra, join the department. In 1952 the Michigan Mathematical Journal is initiated, under the leadership of Rainich, and later **George Piranian**. **H. Chandler Davis**, a member of the department, is forced to leave in 1955 because of refusal to answer questions of a Congressional subcommittee on "un-American" activities. This episode is remembered annually at the Senate Lecture on Academic and Intellectual Freedom. **George Hay** becomes chair in 1957 and holds the position for 10 years.

The history continues on our website lsa.umich.edu/math/about-us/history. Send your own remembrances to math.mich@umich.edu.

Over the past year, the department has received several gifts and bequests which will help support faculty, programs, and students for many years to come. Some of the new funds are highlighted here.

The family of **Usha Sharma Bhalla (right)** established a Mathematics graduate student fellowship fund in her memory. Bhalla was a brilliant student and teacher of math. The family hopes that her passion and aptitude for math will inspire and endure for generations through this endowment.

The **Prasad Family Fellowship** was established by Professor Emeritus Gopal Prasad, his wife Indu and their children Through direct gifts and planned giving, this fellowship will support graduate students in the department. The fellowship was presented to one student in 2016 and four students in 2017.

The department received a bequest upon the passing of **Marjorie VanEenam Butcher**, who received both undergraduate (1947) and Master's (1949) degrees in Mathematics at UM, and had a long career of teaching at Trinity College. Her mother, Weltha McLachlan VanEenam received a degree in 1918 from UM, studying actuarial mathematics. Marjorie met her husband, Robert W. Butcher, while both were employed as math teaching fellows at UM. The Weltha McLachlan Van Eenam, Marjorie Van Eenam Butcher and Robert Ward Butcher Actuarial Mathematics Fund was established to honor of the memory of the esteemed Professor Emeritus Cecil L. Nesbitt, a dear friend of Weltha, Marjorie and Robert. The newly established VanEenam Lectures will regularly bring a distinguished mathematician or industry leader to the department as a special event. The invited speakers will be in Actuarial/Financial Mathematics.

Benjamin R. Whiteley, who received his master's degree in 1952, directed a bequest gift to the Huntington Honorary Fund. Whitley had a 44 year career at Standard Insurance of Portland, Oregon. He was hired as an actuarial clerk, later became an actuary, then Vice-President of the Group, and finally was President and CEO for more than 10 years. His bequest will help support the actuarial program and students.

A bequest was received from the estate of **Arline G. Dahlke-Daly**. Arline was the wife of alum **Douglas L. Daly** who received his Master's degree in Mathematics from UM. During his career, Daly was a Mathematics professor at Indiana University, University of Kentucky, University of Missouri,and Illinois Wesleyan University. He finally retired from Ohio University in 1980. The bequest will be used in the Mathematics Strategic fund to support exceptional cutting-edge work that will have a high impact on mathematics, our students, or our department.

Finally, the department recently received a generous bequest from the estate of **Rodolfo De Sapio**. A long time faculty member of the UCLA Department of Mathematics, De Sapio attended the UM as an undergraduate. He began is studies in the College of Engineering, and after two semesters, switched to the College of LSA and studied mathematics. According to his colleagues, De Sapio's time at the UM studying mathematics changed his life and gave it meaning. This fund will be used to support the De Sapio Postdoctoral Fellows in the department, with a preference toward work in the Inquiry Based Learning program.

2017 Graduate Program Fellowships & Awards

Alice Webber Glover Math Scholarship
Yuanyuan Chen
Lara Du
Alana Huszar
Mitul Islam
Claire Lin
Takumi Murayama
Andrew O'Desky
Yonatan Shelah
Alexander Vargo
Umang Varma
Ningyuan Wang
Xin Zhang
Hai Zhu

Allen L. Shields Fellowship
Jeremy Hoskins

Allotta Family Scholarship
Zhan Jiang

Arthur Copeland Memorial Scholarship
Grace Ingermanson
Alexander Zaitzeff

A. V. Flint Memorial Scholarship
Francesca Gandini

Ben Dushnik Award in Math
Yusin Wang

Cameron & John Courtney Scholarship
Christina Athanasouli
Yunze Lu

Carroll V. Newsom Scholarship
Jonathan Guzman
Aleksander Horawa
Eamon Quinlan
Kannappan Sampath
Nawaz Sultani
Derrick Sund
Konstantinos Tsouvalas
John Wakefield

Department of Mathematics Fellowship
Daniel Barter
Yuanyuan Chen
Rankeya Datta
Lara Du
Han Huang
Grace Ingermanson
Yining Lu
Rongxiao Mi
Takumi Murayama
Raymundo Navarrete
Michael Newman
Ashwath Rabindranath
Jiah Song
Matthew Stevenson
Yan Shuo Tan
Feng Wei
Yun Wei
Derek Wood
Ming Zhang

Edwin Wilkinson Miller Scholarship
Ruian Chen

Gabrielle & Sophie Rainich Fellowship
John Holler

Juha Heinonen Memorial Graduate Student Fellowship
Punya Satpathy
Yan Shuo Tan

Luther Claborn Mathematics Scholarship
Elizaveta Rebrova
Philip Tosteson

Marjorie Lee Browne Scholars
Jay Barraza
Anthony Della Pella
David Guerra
Jonathan Guzman
Alex Kapiamba
Jenia Rousseva
Ursula Trigos-Raczkowski

Mathematics Alumni/ Alumnae Scholarship
Elizabeth Collins-Wildman
Emanuel Reinecke

Mathematics Department Graduate Fellowship
Jineon Baek
Can Chen
Yiwang Chen
Gilyoung Cheong
Kwun Chung
Robert Cochrane
Rankeya Datta
Saibal De
Montek Gill
Haoyang Guo
Jia Guo
Fanchen He
Yifeng Huang
Zhi Jiang
Joseph Kraisler
Harry Lee
Jiayu Liang
Yuchen Liao
Yining Lu
Rongxiao Mi
Khoa Nguyen
Matthew Olson
Gilad Pagi
Jasmine Powell
Huajie Qian
Ryan Sandberg
David Schwein
Rishi Sonthalia
Nathaniel Vaughn
Hao Wu
Wijit Yangjit
Jingjie Zhang
Tianchen Zhao
Feng Zhu

Mathematics Scholarship Fund
Han Huang
Patrick Lenning

National Science Foundation Fellow
Amanda Bower
Mark Greenfield

Devlin Mallory
Robert Walker
Rachel Webb
Farrah Yhee

National Defense Science and Engineering Graduate Fellowship
Leighton Wilson

Peter Smereka Thesis Award
Gary Marple
Olivia Walch

Prasad Family Fellowship
Deshin Finlay
Jacob Haley
Ashwath Rabindrath
David Richman

Rackham One-Term Dissertation Fellows
Trevor Hyde
Robert Lutz
Andrew Melfi
Elizaveta Rebrova
Philip Tosteson

Rackham Outstanding GSI Award
Charlotte Chan
Robert Lutz

Rackham Predoctoral Fellowship
Charlotte Chan
Jake Levinson
Alexander Munk
Bowei Wu

Rackham Science Award
Derrick Sund

Research Training Grant (RTG) Algebra
Harold Blum
Gene Kopp
Gilad Pagi
Rohini Ramadas

Ph.D. recipients Robert Silversmith and Rohini Ramadas in Ann Arbor. The coupled married while they were graduate students in the department.

2017 Doctorate Degrees

Daniel Barter completed the dissertation "*Some Remarks About the Interaction Between Quantum Algebra and Representation Stability*" under the direction of Andrew Snowden.

Dondi Ellis completed the dissertation "*Motivic Analogues of* MO *and* MSO" under the direction of Igor Kriz. Dondi is an instructor at Washtenaw Community College.

Stefan Froehlich completed the dissertation "*Polyhedral Analysis of Plethysms and Kronecker Coefficients*" under the direction of John Stembridge.

Roman Gayduk completed the dissertation "*Game-Theoretic Approach for Modeling Market Microstructure*" under the direction of Sergey Nadtochiy. He will be a Quantitative Analytics Associate at Barclays New York.

Weichen Gu completed the dissertation "*Computations of Mather Minimal Log Discrepancies*" under the direction of Mircea Mustata. Weichen will be a Quantitative Researcher at Susquehanna International Group.

Kevin Hannay completed the dissertation "*Macroscopic Models and Phase Resetting in Coupled Biological Oscillators*" under the direction of Victoria Booth and Daniel Forger. He will be an Assistant Professor of Mathematics at Schreiner University.

Jeremy Hoskins completed the dissertation "*Diffuse Scattering and Diffuse Optical Tomography on Graphs*" under the direction of Anna Gilbert and John Schotland. He will be a Gibbs Assistant Professor at Yale.

Matthew Jacobs completed the dissertation "*Algorithms for Multiclass Partitioning*" under the direction of Jin-ho Baik. He will be an Adjunct Assistant Professor at UCLA.

Gene Kopp completed the dissertation "*Indefinite Theta Functions and Zeta Functions*" under the direction of Jeffrey Lagarias. He will be a Heilbronn Research Fellow at the University of Bristol.

Jake Levinson completed the dissertation "*Foundations of Boij-Söderberg Theory for Grassmannians*" under the direction of David Speyer. He will be an Acting Assistant Professor at University of Washington, Seattle.

Alexander Munk completed the dissertation "*Beliefs and Uncertainty in Stochastic Modeling*" under the direction of Erhan Bayraktar. He will be a Quant/Financial Engineer at Chicago Trading Company.

Rohini Ramadas completed the dissertation "*Dynamics on the Moduli Space of Pointed Rational Curves*" under the direction of Sarah Koch and David Speyer. She has a NSF Postdoctoral Fellowship at Harvard.

Andrew Schaug completed the dissertation "*Dualities Arising from Borcea-Voisin Threefolds*" under the direction of Yongbin Ruan.

Robert Silversmith completed the dissertation "*A Mirror Theorem for Symmetric Products of Projective Space*" under the direction of Yongbin Ruan. He will be a Research Assistant Professor at Simons Center for Geometry and Physics in Stony Brook, NY.

Derek Wood completed the dissertation "*A Mode Coupling Theory for Random Waveguides with Turning Points*" under the direction of Liliana Borcea. He will be a technical staff member with Systems and Technology Research in Woburn, MA.

Actuarial Program Highlights

Our Actuarial Program at UM was given the prestigious designation of a Center of Actuarial Excellence (CAE) in 2010 by the Society of Actuaries, which continues to be renewed annually. We went through a 5-year validation of our designation as CAE in 2015. We are of course proud that we are only one of 29 actuarial schools in the entire world (not just the U.S.) with this elite status.

I am extremely pleased that the Student Actuaries at Michigan (SAM) club has more than 250 members. Currently, there are 106 students who have declared Actuarial Math as their major. More importantly, another 150 students (two-thirds of them freshmen and sophomores) have expressed interest in joining our field. I cannot be more proud of the SAM Board who has done an outstanding job of bringing awareness of the actuarial field to the student community at large.

The Actuarial Program and the University Career Center jointly held the Second Annual Actuarial Career Expo on October 5, 2017. Nineteen organizations participated in this event, with more than 125 students having the opportunity to meet with employers, who conducted 144 interviews the following day. More employers are paying increased attention to our actuarial students, who have business acumen in addition to actuarial technical knowledge. Even though every actuarial math major can take various business courses, it is a significant competitive advantage if a student is accepted by the Ross School of Business to minor in business administration. We are encouraging actuarial students to add a business minor to their curriculum.

We held our Fifteenth Annual Nesbitt-Huntington Actuarial Commencement on April 29, 2017 for those who graduated during the academic year 2016-17. Our keynote Speaker was **James W. MacGinnitie**, who was a former President of the Society of Actuaries, Casualty Actuarial Society, American Academy of Actuaries, and International Actuarial Association. Of the 47 actuarial students who graduated in the academic year 2016-17, 14 of them had second major and another 11 of them had a minor in a related area (Economics, Statistics, Computer Science, and Business Administration).

The Society of Actuaries and the Casualty Actuarial Society have made significant changes to the actuarial exams needed to become associates of the respective actuarial bodies. There are also changes to the subjects for which one can get credit for VEEs (Validation by Education Experience). We are investigating ways to make the necessary adjustments to keep our program highly competitive in the market place.

The group "Student Actuaries at Michigan" in FaceBook facilitates communication among the current and former students. Currently, there are 564 members in this group. In addition, we encourage all the alumni/ae to join University of Michigan Actuaries group in LinkedIn using the link www.linkedin.com/groups/2486220 . There are 460 members in this group. These groups allow for more direct communication to and between our alumni. I plan to keep in touch with our students and alumni through these social media outlets.

B. Roger Natarajan
Actuarial Program Director

Members of the Actuarial Alumni Leadership Council who met in October.

Scholarship Recipient
Amanda Burcroff

I am currently a junior at UM studying honors mathematics and computer science. Mathematics has always been a passion of mine, and I first realized my potential in math when I completed all of my high school's math courses and began to take proof-based undergraduate courses as a high school sophomore. By the time I graduated high school I had taken six college math courses, and I was very eager to continue. My sights were set on a career in mathematics when I took the first course in the UM honors sequence, Math 295, and realized that there was nothing I would rather do.

The generous financial support I have received from Math Department scholarships has allowed me to focus fully on my studies and to work to be an active part of the UM community. I have had the opportunity to research with Michigan's Lab of Geometry and take several graduate-level classes. I have enjoyed teaching and working with other students through the four course assistant positions I have held for UM math courses and through my leadership in the Women in Mathematics Club as well as the Society of Undergraduate Math Students. My time at UM also allowed me to study abroad in Hungary with the Budapest Semesters in Math program and land a spot at the prestigious University of Chicago summer research program. I hope to continue on to graduate school in theoretical mathematics.

2017 Undergraduate Awards

Departmental Scholarships

During the 2016-17 academic year, the Department provided scholarship support to 57 students. The majority of the 13 named scholarship funds were established by individuals to provide tuition support. More details on the funds, and the impact on the recipients' educational career, will be included on our webpage.

Putnam Competition

The Department's team for this year's William Lowell Putnam Competition placed 18th out of more than 400 teams. The members of the team were **Samuel Tenka, Alan Xu,** and **Pengbo Zhang**. In the individual competition, **Pengbo Zhang, Shiliang Gao, Samuel Tenka** and **Alan Xu** finished in the top 300 out of more than 4100 students.

In the 34th Annual University of Michigan Undergraduate Mathematics Competition **Raghav Prabu** placed first, with a tie for second place between **Hai Tran Bach** and **Juntai Zhou.**

Evelyn O. Bychinsky Awards

recognizing underclass students who show exceptional promise in mathematics:

Amanda Burcroff
Ryan Capouellez
Wenyu Jin
Max Kontorovich
Xuenan Li
Wanxing Liu
Eric Winsor
Tiantian Ye

Leon P. Zukowski Prize

recognizing outstanding service in the Mathematics Learning Center:

Nurul Hazita Mohd Azmi

Mathematics Alumni/Alumnae Scholarship

Andrew Gitlin

Jack McLaughlin Award in Algebra

Daniel Minahan

Wilfred Kaplan Award in Applied Mathematics

Thierry Laurens

William LeVeque Award in Number Theory

Yifan Wu

Frank Raymond Award in Geometry and Topology

Carsten Sprunger

George Piranian Excellend in Mathematical Writing Award

Samuel Tenka

Sumner B. Myers Award in Analysis

Xuenan Li

Marilyn and Stewart Gloyer Award

Lawrence Teng

Outstanding Achievement in Mathematics Awards

Ruizhi Deng
Siddhant Dogra
Zihao Gao
Zifan Li
Joshua Lucksom
Tianrui Wang
Qinglai Zeng
Mengrui Zhang
Mingyuan Zhang
Shangnan Zhou

Otto C. Richter Memorial Prize

Rui Zhong

Irving Wolfson Award

Bryce Peterson

D.W. Simpson Award

Kah Jun Lim

Natarajan Family Award

Qinglai Zeng
Rohini Choudhury

Lois Zook Levy Award

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

Sarah Stecher

Michigan Mathematics Merit Scholar

Aman Sharma
Zitong Chong
Raghav Prabhu

Margaret S. Huntington Awards

Claire Hartman
Bharat Chopra
Aleksander Kupe
Lee-Yang Lin
Sean Russell
Joshua Segal
Kai Xuan Shau
Matthew Stewart
Hannah Vogelsang

Outstanding Graduating Seniors

Gwyneth Moreland
Carsten Sprunger
Wenli Zhao

Wirt and Mary Cornwell Prize in Mathematics

Yifan Wu

Left: Wenli Zhao, Carsten Sprunger, and Gwyneth Moreland, winners of the Outstanding Graduating Senior Award. Above: Roger Natarajan presents the Irving Wolfson Award to Bryce Peterson.

Alumni Updates

Frank Benford (B.S. 1967) recently published two papers on the subject of Benford random variables. Frank is the grandson of physicist Frank Benford (also a UM graduate) for whom "Benford's Law" is named.

Teresa Peteson (B.S. 1967, M.A. 1968) is an Adjunct Math Professor with Gogebic Community College in Houghton, MI.

Stephen E. Usher (M.A. 1977, Ph.D. Economics 1978) reports that during his education he studied one summer in Switzerland with the late Dr. Georg Unger. Unger wrote his dissertation under Paul Finsler - famous for Finsler spaces - but also for an allegedly failed theory of sets. Finsler's set theory was rejected by the profession, but Unger taught it to Usher and gave him an English translation. Much later the translation made its way to Usher's friend Dr. David Booth, a mathematician from University of Wisconsin, and he, together with Renatus Ziegler, a Swiss PhD mathematician, published FINSLER SET THEORY: PLATONISM AND MATHEMATICS. In the third chapter of his set theory Finsler gives this definition: "A set M of SIGMA is said to be circle-free if M together with every set essential in M is independent of the concept 'circle-free'." The definition is thus circular!

David Kotzian (B.A. 1981, J.D. 1984, Ph.D. Economics 1987) completed a joint degree program in Economics and Law, with concentrations in labor economics and econometrics. Since 1985 he has been representing employees in discrimination, wrongful discharge and other civil rights cases. He is currently a shareholder in a Detroit area law firm.

Nancy Dynes (B.S. 1987, MBA 1996 Indiana) is a Metric Consultant with Eli Lilly. She reports that her math degree prepared he well for understanding data and developing operational metrics - skills that were not taught back then but are valuable now.

Michelle Scavone (BS 1989) is a Senior Consultant with Willis Towers Watson.

Adam Bloomfield (B.S. 1993, M.D. 1997 Rutgers) is the Field Medical Director, Respiratory/Infectious Diseases for AstraZeneca.

Geoffrey Buhl (B.A. 1997) received his PhD from University of California, Santa Cruz. He was recently promoted to Professor of Mathematics at California State University Channel Islands.

Haywai Hayward Chan (B.S. 2005) is a Software Engineer at Google.

Phoenix Zhang (B.S. 2015) is an Actuarial Analyst at Spring Consulting Group.
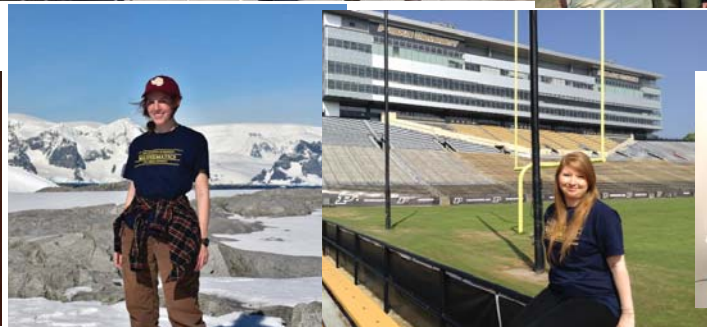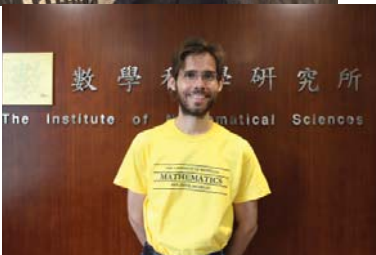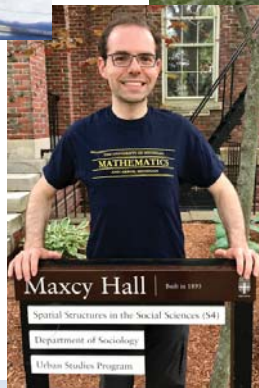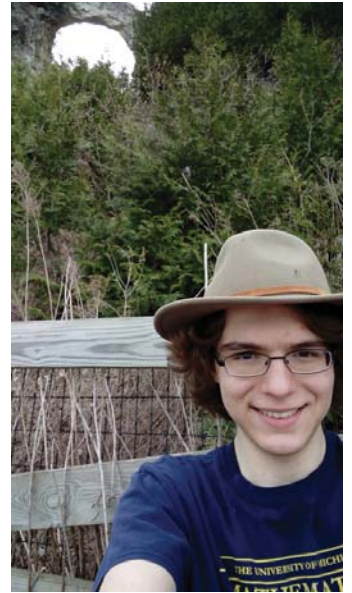
Awards Ceremony & Graduation Reception

Clockwise from left: Joe Conlon with Zihao Gao, 1 of 10 Outstanding Achievement in Mathematics awardees; PhD recipient Weichen Gu with Mel Hochster; Hannah Vogelsang, Matthew Stewart, and Alexsander Kupe, 3 of 9 Margaret S. Huntington Prize awardees; Aman Sharma, Raghav Prabhu, and Zitong Cheng are the Michigan Mathematics Merit Scholars; Wenju Jin, Ryan Capouellez, Amanda Burcroff, and Max Kontorovich are 4 of 8 recipients of the Evelyn O. Bychinsky Award, presented by Stephen DeBacker.

Where's Your Math T-shirt Been?

First row l-r: Bert Ortiz skiing on the solstice, Mt. Rainier, WA; Tali Khain (2019) and her brother on a mountain in CA; Noah Luntzlara (2021) at Arch Rock on Mackinac Island, MI. Second row l-r: Jessica Fintzen at Haribo in Kessenich, Germany; Daniel Hirschman at Brown University; Conor Puritz and Hannah Vogelsong (2020) in Versailles; Kerry Taylor (2019) at the National Trout Memorial, Kalkaska, MI. Third row l-r: Roi Ozrach (2020) in Jerusalem; Eric Tang (2017) on the Great Wall; Kyle Sinclair (2011) with his bride on their honeymoon in Machu Picchu; Fourth row l-r: Loren Spice in Hong Kong; Anna Clinger in Antarctica; Megan Tartal at Purdue;Mengxi Wang at D.E. Shaw.

LSA MATHEMATICS
UNIVERSITY OF MICHIGAN

Please send alumni updates or other information to math.mich@umich.edu

Want Your Own Math T-Shirt?

Here is your chance to represent the Math Department in the stylish shirts highlighted on the previous page. Complete the order form below by placing a number (signifying the quantity desired) in the appropriate boxes (sizes are standard adult), complete your address information, and return to the address at right along with your check or money order (payable to the Department of Mathematics). T-shirts are $9 each, shipping and handling is included.

	Blue	Gray	Yellow	Pink
Small				
Medium				
Large				
X-Large				

Where should we mail your t-shirt?

Name:_____

Address1: _____

Address 2:_____

City:_____ State: _____ Zip:_____

Amount Enclosed: _____

Total T-shirts Ordered: _____

E-mail Address: _____

Send this form with payment to:

The University of Michigan
Department of Mathematics
Undergraduate Office
530 Church Street
2082 East Hall
Ann Arbor, MI 48109-1043