ContinuUM

University of Michigan Department of Mathematics NEWSLETTER • 2018

Lagarias Named Distinguished University Professor

Jeffrey Lagarias has been appointed the Harold Mead Stark Distinguished University Professor of Mathematics. This distinction is considered one of the University's highest honors and recognizes senior faculty with exceptional scholarly or creative achievements, national and international reputations for academic excellence, and superior records of teaching, mentoring, and service.



After receiving his Doctorate in 1974 from the Massachusetts Institute of Technology, Lagarias began his career as a member of the technical staff at A.T.&T. Bell Laboratories. 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 published more than 200 journal and conference papers and given numerous invited presentations, plus holds five patents. 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 11 PhD students, has two current PhD students, and 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.

View From the Chair's Office Anthony Bloch

Our math department has had a productive and satisfying year. I am indebted to our excellent faculty members and staff for continuing to keep the department in such good shape. 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, Mattias Jonsson our Doctoral Chair, Kartik Prasanna our head of admissions, Silas Alben our head of the Applied and Interdisciplinary Mathematics Program and all the other members of the department who have worked so hard this year. I really want to thank Doreen Fussman, our Chief Administrator, and her extremely capable staff, all of whom are absolutely essential to the smooth functioning of our department.

On the hiring front we were extremely fortunate to make three excellent hires: Zaher Hani in partial differential equations, and Jenny Wilson and Alex Wright in topology and geometry (see page 3). The college was very helpful to us on the hiring front. We were also fortunate to hire an excellent incoming group of Postdoctoral Assistant Professors and admit a stellar group of new graduate students.

Our program in quantitative finance continues to run very well under the leadership of Erhan Bayraktar, Charlie Doering is still at the helm of Complex Systems, and John Schotland runs our Michigan Center for Applied and Interdisciplinary Mathematics (MCAIM). MCAIM ran several excellent events this year including a summer school on Random Matrices, a Women in Mathematics of Materials Workshop, and a wonder-

ful conference in honor of Peter Smereka which was organized by Selim Esedoglu and Giovanni Russo.

Our faculty continue to accrue numerous honors. Many are funded externally, sometimes from multiple sources. Their achievements are highlighted to the left and on page 2.

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Faculty News



Professor Liliana Borcea, the Peter Field Collegiate Professor of Mathematics, has been named a 2018 Fellow of the Society of Industrial and Applied Mathematics (SIAM). Fellowship honors SIAM members who have made outstanding contributions to the fields served by the organization.

Professor Selim Esedoglu presented an invited lecture entitled "Algorithms for motion of networks by weighted mean curvature" at the 2018 International Congress of Mathematicians in Rio de Janeiro, Brazil.

Post Doctoral Assistant Professor Jessica Fintzen is one of three recipients of the 2018 Dissertation Prize from the Association for Women in Mathematics. The prize recognizes outstanding dissertations defended by female mathematical scientists within the preceding 24 months. She also received the 2018 Friedrich Hirzebruch Dissertation prize for her thesis "On the Moy-Prasad filtration and stable

vectors." An informational video is posted on our website.

Professor Sergey Fomin, the Robert M. Thrall Collegiate



2018 Steele Prize for Seminal Contribution to Research in Discrete Mathematics/Logic. The prize recognizes his paper with Andrei Zelevinsky (posthumously) "Cluster Algebras I: Foundations," published in 2002 in the Journal of the American Mathematical Society. Presented annually by the American Mathematical Society, the Steele Prize is awarded for a paper that

Professor of Mathematics, received the

has proved to be of fundamental or lasting importance in its field, or a model of important research.



Professor Daniel Forger presented his research on the role of neuroscience in modeling mathematical representations of music at the 2018 SIAM Conference on Life Sciences. The presentation is featured on the SIAM website. He is also part of an international team that will examine how and why adult humans consolidate their sleep into one long period.



Professor Anna Gilbert, the

Herman H. Goldstine Collegiate Professor of Mathematics, has received funding from the Chan Zuckerberg Initiative DAF, an advised fund of the Silicon Valley Community Foundation, for her project "Identifying genetic markers: dimension reduction

and feature selection for sparse data." Her project is part of a large effort involving collaborative computational tools to support and contribute to efforts to develop the Human Cell Atlas. The goal of the Human Cell Atlas project is to create a shared, open reference atlas of all cells in the healthy human body as a resource for studies of health and disease.



Postdoctoral Assistant Professor Neriman Tokcan has been named one of twelve inaugural recipients of the Michigan Precision Health Scholars Awards. Her project entitled "A novel tensor similarity score for the classification of cardiac index" addresses the challenges of analyzing multidimensional data in biomedical data processing.

2018 Simons Fellows

Three faculty members have received prestigious Simons Fellowships in 2018. Professors Lydia Bieri, Jeffrey Lagarias, and Mircea Mustată received the fellowships, which provide funding for up to a semester-long research leave.

Faculty Promotions

Three faculty members received promotions to professor this year. Bhargav Bhatt joined the UM Mathematics faculty in 2014 in the area of algebraic geometry. Victoria Booth came to UM as a post-doc in 2004, has been a faculty member since 2007 in applied mathematics/mathematical and computational neuroscience. Andrew Snowden came to UM in 2013 and studies number theory, algebra, and algebraic geometry.

Postdoctoral Teaching Awards

Recently the Department established awards for postodoctoral faculty to recognize excellence in teaching, mentoring and research. The awards are named to honor past faculty members. The 2018 recipients are:

Frederick Gehring Award - Evangelia Gazaki

Juha Heinonen Award - Diana Hubbard

Allen Shields Award - Camelia Karimianpour

B. Alan Taylor Award - Howard Levinson

Peter Scott Retires

Professor Peter Scott retired from active faculty status on May 31, 2018.

After attending Oxford University for his BA in Mathematics, Professor Scott received his MSc and PhD from University of Warwick in 1969 under the direction of Brian Sanderson. He held ascending appointments at University of Liverpool from 1968 to 1987, beginning as an Assistant Lecturer prior to his PhD and Lecturer the following year, receiving tenure in 1972, and was named Senior Lecturer in 1980, then Reader in 1984. He joined UM as Professor of Mathematics in 1987. In 1986, Professor Scott was awarded the Berwick Prize by the London Mathematical Society. In 2012, he was named a Fellow of the American Mathematical Society.

Professor Scott studies geometric group theory and low-dimensional geometry and topology. In geometry and



Zaher Hani joined the UM Mathematics Department in 2018 as an Associate Professor. He received his

PhD in 2011 at the University of

California at Los Angeles under the direction of Terence Tao. Professor Hani was a

Simons Postdoctoral Fellow and Courant Instructor at the Courant Institute of Mathematical Sciences at New York University from 2011 to 2014, and was an Assistant Professor at Georgia Institute of Technology prior to joining UM

Professor Hani studies partial differential equations along with its intersections with wave turbulence, infinite dimensional Hamiltonian dynamics, and

topology, he is best known for his fundamental research on three-dimensional manifolds, but his work also encompasses important contributions to the theory of Kleinian groups, differential geometry, and the study of minimal surfaces. In geometric group theory, he pioneered the study of subgroup separability and explored canonical splittings of groups which are analogues of

real-variable harmonic analysis. He has received a Sloan Research Fellowship as well as an NSF CAREER grant.

Jennifer Wilson joined the UM Mathematics Department in 2018 as an Assistant Professor. She received her



2014 to 2018. Professor Wilson studies geometry and topology, often using tools from representation theory, commutative algebra, and combinatorics.

New Faculty

PhD in 2014 from the University of Chicago under the direction of Benson Farb. She was a Szegö Assistant

Professor at Stanford University from

important topological decompositions of 3-dimensional manifolds. He is widely regarded as a masterful expositor who has written influential survey papers, most famously on the geometrization of 3-manifolds and on the use of topological techniques in geometric group theory. He has published 60 research papers with several co-authors.

During his UM tenure, Professor Scott was very involved with the Mathematics Doctoral program. He supervised 21 PhD students and was on the committees of many others. He served for a total of 11 years on three separate occasions as Chair of the Doctoral Committee. This position supervises and monitors the academic progress of approximately 100 Mathematics doctoral students. He was also Director of Graduate Admissions for a year, reviewing and recruiting students for the Mathematics PhD program. Professor Scott has served on several other departmental committees, including terms on the Executive, Long Range Planning, and Personnel Committees.

Alexander Wright joined the UM Mathematics Department in 2018 as a VisitingResearch Scientist and will be

an Assistant Professor in 2019. He received his PhD in 2014 from the University of Chicago under the direc-



tion of Alex Eskin. He received a Clay Research Fellowship in 2014, and held positions at the Mathematical Sciences Research Institute, the Institute for Advanced Study, and Stanford University.

Professor Wright studies geometry and dynamics, especially on moduli spaces, and special families of algebraic curves that arise in this context. His other areas of interest include Teichmüller theory and ergodic theory on homogeneous spaces.

MMSS Program Update

In August 2018, the Michigan Math and Science Scholars (MMSS) Program completed its 18th year. MMSS is a summer enrichment program, which aims to increase knowledge and foster an interest in math and science among high school students.

The 2018 MMSS program ran from June 24 to August 3. There were three, two-week sessions. Four-hundred fifty nine high school students from around the world participated in one or more of the 34 courses offered, filling 513 seats. This year saw relatively equal numbers of male and female participants. Nine academic fields were represented by our course offerings including Mathematics, Physics, Chemistry, Biology, Psychology, Astronomy, Statistics, Anthropology, and Environmental Science.

Attendees experienced college-level instruction along with state of the art facilities. The UM Advanced Physics Lab, Science Learning Center, Undergraduate Science Building, Chemistry labs, and updated classrooms were available to students to learn, explore, and conduct research. West Quad served as their home away from home.

MMSS will again host students in the summer of 2019 for the following sessions:

Session 1: June 23-July 5 Session 2: July 7-19 Session 3: July 21-August 2

Application and course information will be available in early January at lsa.umich.edu/math/centers-outreach.



Participants in the Art and Mathematics course investigate perspective with legendary street artist David Zim.

Words from the Associate Chair for Graduate Studies

Our graduate programs are going strong! For the 2018-2019 school year, we have 147 PhD students (including AIM). 8 Mariorie Lee Browne Research Master's students (a "bridge to PhD program"), and another 13 Master's students in math, AIM, and the actuarial program. This spring, we successfully hosted our first ever annual Graduation Celebration for our finishing PhD and Master's students. Graduates Gilad Pagi and Audra McMillan entertained us with funny and moving speeches. Some images from the event are included below and on page 7.

Pages 6-7 contain a full list of Graduate Awards and PhD recipients. We continue to honor the outstanding math doctoral thesis with the Sumner Myers award. We are fortunate to also be able to recognize the outstanding AIM doctoral thesis with the recently established Peter Smereka Award.

The bulk of our PhD graduates continue to accept post-doctoral positions at Universities around the world, while a growing number are entering exciting industry positions. In some ways, there has never been a better time to be a math PhD looking for a job. According to a recent report from the McKinsey Global Institute, the "US alone faces a shortage of 140,000 to 190,000 people with deep analytical and technical skills and over 1.5 million managers and analysts to analyze big data and make decisions based on their findings." The data revolution is driving this demand.

On the topic of trends in graduate education, the National Academies of Science, Engineering and Medicine issued a critical report entitled "Graduate STEM Education for the 21st Century." This report resonated with me. I know from over two decades of conversations with graduate students that we can and must improve our program, as the National Academies' report recommends, by increasing PhD students' (and advisors'!) awareness and readiness for the many fulfilling mathematical careers

outside academia. Figuring out how to reform our program along these lines will be a key goal for my Associate Chairmanship over the next few years.

As a start, I've been reconnecting with Michigan Math alumni to get their advice. It's been thrilling to hear about the many exciting, meaningful (and often lucrative!) careers they are wholeheartedly enjoying. The ContinUM will start a regular feature, Spotlight on Doctoral Alumni, so that ContinUM readers can glimpse the remarkable breadth and depth of our collective achievements. Prepare to be impressed!

As always, students and faculty in the doctoral programs at Michigan are grateful for the help and guidance of the graduate office staff. We are happy to have added Teresa Stokes and Anne Speigle to the office this year.

Alums: Please shoot me a line about what you're up to these days, especially if you are willing to participate in my project to promote student awareness of non-academic careers for Math PhDs.

> Professor Karen Smith Associate Chair for Graduate Studies



Associate Chair for Graduate Studies Karen Smith and PhD recipient Gilad Pagi.

Spotlight on Doctoral Alumni

Luis Serrano

Head of Content - Artificial Intelligence and Data Science at Udacity

Dr. Serrano defended his PhD thesis "Noncommutative Schur P-Functions and the Shifted Plactic Monoid," under the direction of Sergey Fomin in 2010.



Luis loves his job at Udacity, where he leads the content and curriculum creation teams for Artificial Intelligence, Machine Learning, and Data Science. He loves teaching, learning, applying mathematics to real life problems, and working with smart like-minded individuals. He believes that a high quality education should be available to every human on earth, and strives for that purpose every day using technology. As side projects, he maintains his own YouTube channel of machine learning and math videos, with over 25 thousand subscribers and over a million views, and he is writing a book called "A Friendly Introduction to Machine Learning."

In 2014, Luis moved to sunny California to accept an enticing offer from Google, where he worked with the video recommendations team in YouTube. Before this, he held a postdoctoral position at the University of Quebec at Montreal, where he taught probability and did research in algebraic combinatorics for four years.

Luis is enthusiastic about his life as a professional mathematician in industry and is eager to connect with students and alumni considering making the transition.

Words of wisdom from Luis: "As a graduate student, I was always worried about the academic job market. If I had had an idea of how easy it is for a math PhD to find a fascinating six-figure job in an amazing city, I would have worried less and enjoyed my academic career more."

> East Hall and the Math Department on the left, with the new 13-story non-university apartment complex being built on the right.

Notes from the Chair

(continued from page 1)

In milestones we were sad to say goodbye to Lee Zukowski who served the department so well over so many years in an administrative as well as teaching capacity. We remembered him at the emeritus faculty lunch. We also honored Peter Scott who retired after being one of the mainstays of our topology program and doctoral program (see page 3). We wish him a happy retirement. As this goes to press, we were very sorry to learn of the passing of emeritus Professor James Kister. We will have more about him in a future edition.

We were fortunate to have many excellent lectures and seminars in the department as usual. A highlight was the Marjorie Lee Browne Colloquium on "Hidden Figures: Bringing Math, Physics, History, and Race to Hollywood," which was given by Talitha Washington in place of Rudy Horne, who passed away earlier in the year. It was a wonderful talk and celebration of mathematics and the African American women mathematicians who played such a vital role at NASA.

We were lucky to have three excellent lecture series: Richard Taylor gave the Rainich lectures on Number Theory, Nizar Touzi gave the newly-founded Van Eenam lectures on actuarial and financial mathematics, and Gunther Uhlman gave the Ziwet lectures on inverse problems.

Our innovative calculus program continues to do well, as does our center for Inquiry Based Learning (IBL) directed by Ralf Spatzier. The Michigan Math and Science Scholars (MMSS) summer program continues to attract able high school students from across the globe.

We were very pleased to receive a generous gift from the Parekh Family which will support IBL, MMSS and our math circles program activities. We are very grateful for all of the continued wonderful donations to the department from our alumni, faculty, emeritus faculty, and friends.

It is impossible to close this column without mentioning the large apartment building going up next door to East Hall, whose noisy construction goes on even as I write this. We hope for quieter times ahead and that the final view, or lack of it, will not be too terrible. Perhaps someone will empathize with us and will dig deep in their pocket to donate a large sum of money for a new building. Those of us with a south-facing view that is now a building wall will thank you!



2017-2018 Graduate Program Fellowships & Awards

Alice Webber Glover

Math Scholarship Jacob Haley Michael Austin Lewis Yuchen Liao Nathanial Vaughn

Allen L. Shields Fellowship Elizaveta Rebrova

Department of Mathematics Fellowship

Brandon Carter (Winter) Gabriel Frieden (Winter) Alexander Leaf (Winter)

Ford Foundation Predoctoral Fellowship Robert Walker

Juha Heinonen Memorial Graduate Student Fellowship Haoyang Guo

Marjorie Lee Browne Scholars

Joseph Ballardo Esteban Coronel Balcazar Uzziel Cortez David Guerra Alex Kapiamba Moise Mouyebe Jenia Rousseva Ursula Trigos-Raczkowski

Mathematics Alumni/ Alumnae Scholarship

Daniel Irvine

Mathematics Department Graduate Fellowship

Christina Athanasouli Craig Tyler Bolles Karen Butt Attilio Castano Can Chen Yiwang Chen Kwun Chung William Clark Robert Cochrane

William Dana Saibel De Anthony Della Pella Peter Dillery Lara Du Montek Gill Jonathan Guzman Fanchen He Aleksander Horawa Yifeng Huang Alana Huszar Mitul Islam Zhan Jiang Ryan Kohl Benjamin Krakoff Harry Lee Jiayu Liang Claire Lin Yunze Lu Chrisiana Mavroviakoumou Andrew McMillan Shubhodip Mondal Alapan Mukhopadhyay Khoa Nguyen Carsten Peterson Jasmine Powell David Richman Kannappan Sampath Ryan Sandberg David Schwein Sanal Shivaprasad Binglin Song Jiah Song Rishi Sonthalia Nawaz Sultani Konstantinos Tsouvalas John Wakefield Ningyuan Wang Yinan Wang Yuxin wAng Nicholas Wawrykow Yueqiao Wu Wijit Yangjit Farrah Yhee Alexander Zaitzeff Jingjie Zhang Xin Zhang Yili Zhang Feng Zhu Hai Zhu Bradley Zykoski

National Science Foundation Fellow

Amanda Bower Jonathan Gerhard Mark Greenfield Devlin Mallory Farrah Yhee

National Defense Science and Engineering Graduate Fellowship Leighton Wilson

Peter Smereka Thesis Award Kevin Hannay Jeremy Hoskins

Prasad Family Fellowship Zhi Jiang Eamon Quinlan

ProQuest Distinguished Dissertation Award Jeremy Hoskins

Rackham International Student Fellowship

Gilyoung Cheong Jia Guo Yonatan Shelah

Rackham One-Term

Dissertation Fellows Francesca Gandini Joseph Kraisler Yining Lu Andrew O'Desky

Punya Satpathy Rackham Outstanding

GSI Award

Trevor Hyde Joseph Kraisler

Rackham Predoctoral

Fellowship Charlotte Chan Trevor Hyde Takumi Murayama Bowei Wu

Rackham Science Award

Amanda Bower Craig Tyler Bolles Elizabeth Collins-Wildman Anthony Della Pella Jonathan Guzman Andrew McMillan Eamon Ouinlan Nawaz Sultani Derrick Sund Robert Walker

Research Training Grant

(RTG) Geometry Ruian Chen Samantha Pinella Rachel Webb

Sumner B. Mvers **Memorial Prize**

Rohini Ramadas

The Department of Mathematics Outstanding **Teaching Award** Umang Varma

The Karen Rhea Excellence in Teaching Award Daniel Irvine

The Mort Brown Excellence in Teaching Award

Francesca Gandini

The Pat Shure Excellence in Teaching Award

Patricia Klein

Usha Sharma Bhalla Fellowship

Matthew Olson Alexander Vargo

Wirt & Mary Cornwell Prize in Mathematics

Charlotte Chan

Audra McMillan completed her dissertation "Differential Siddhant Agrawal completed the dissertation "On the Privacy, Property Testing and Perturbations" under the direc-Motion of Angled Crested Type Water Waves" under the direction of Sijue Wu. Siddhant will be a visiting assistant professor tion of Anna Gilbert. She has a post-doc position at Boston at the University of Massachusetts. University.

Harold Blum completed his dissertation "Singularities and K-stability" under the direction of Mircea Mustață. He will be an NSF post-doc researcher at the University of Utah.

Brandon Carter completed his dissertation "Jochnowitz Congruences at Residual Primes" under the direction of Kartik Prasanna. He will be a software engineer at Google, Inc.

Charlotte Chan completed her dissertation "Period Identities of CM Forms on Quaternion Algebras" under the direction of Kartik Prasanna. She will be a post-doc at Princeton, then a Moore Instructor at MIT.

Rankeya Datta completed the dissertation "A Tale of Valuation Rings in Prime Characteristic" under the direction of Karen Smith. Rankeya has a post-doc position at University of Illinois, Chicago.

Gabriel Frieden completed his dissertation "Geometric *Lifting of Affine Type A Crystal Combinatorics*" under the direction of Thomas Lam. He will will be a post-doc in the Combinatorics Laboratory at Université du Québec à Montréal.

Patricia Klein completed her dissertation "Relationships among Hilbert-Samuel Multiplicities, Koszul Cohomology, and Local Cohomology" under the direction of Mel Hochster. She has a post-doc position at the University of Kentucky.

Alexander Leaf completed his dissertation "The Kashaev Equation and Related Recurrences" under the direction of Sergey Fomin. He will be a quantitative researcher at DRW Holdings in Chicago.

Viswambhara Makam completed the dissertation "Invari-Feng Wei completed the dissertation "Measure Concentration and Non-asymptotic Singular Values Distributions of ant Theory, Tensors and Computational Complexity" under the direction of Harm Derksen. Viswambhara has a post-doc posi-Random Matrices" under the direction of Mark Rudelson. tion at the Institute for Advanced Study.



Ravmundo Navarette.

2018 Doctorate Degrees

Raymundo Navarettte completed his dissertation "Embeddings and Prediction of Dynamical Time Series" under the direction of Divakar Viswanath. He has a post-doc position at the University of Arizona.

Michael Newman completed his dissertation "Some Ins and Outs of Quantum Fault-Tolerance" under the direction of Martin Strauss. He has a post-doc position at Duke University.

Gilad Pagi completed the dissertation "Enhanced Algorithms for F-pure Threshold Computation" under the direction of Karen Smith. Gilad will be a software engineer with Google, Inc.

Ashwath Rabindranth completed the dissertation "Pseudoeffective Cones and Morphisms of Projective Varieties" under the direction of Mircea Mustată.

Elizabeta Rebrova completed her dissertation "Spectral Properties of Heavy-Tailed Random Matrices" under the direction of Roman Vershynin. She will be an adjunct assistant professor at the University of California, Los Angeles.

Scott Rich completed the dissertation "Interacting Mechanisms Driving Synchrony in Neural Networks with Inhibitory Interneurons" under the direction of Victoria Booth. He will be a research fellow at the Krembil Research Institute, Toronto. Canada.

Yan Shuo Tan completed the dissertation "Some Algorithms and Paradigms for Big Data" under the direction of Anna Gilbert and Roman Vershynin. Yan has a post-doc position at the University of California, Berkeley.

Undergraduate Awards Ceremony and Commencement Activities

For the first time, in 2018 the Mathematics Department was able to hold a formal ceremony for their graduates. There were 195 Mathematics majors who received their degrees from Fall 2017 to Summer 2018. The ceremony featured three speakers: Madison Cox, Xinshan (Molly) Li, and James Seiner. The students provided distinct insights into what is it like to study Mathematics at Michigan in 2018. Each graduate attending was recognized and received a puzzle that was custom-made for the occasion. The video of the ceremony is available on the undergraduate portion of the Department's website.

Prior to the graduation ceremony, the Awards Presentation recognized the outstanding achievements of graduating and current Mathematics students. All graduates and their families were welcomed at the Commencement Reception held in the Mathematics Atrium.



Clockwise from above: Graduate Ali Shand with Undergraduate Program Director Stephen DeBacker. Professor Alexander Barvinok with Michigan Mathematics Merit Scholars Lawrence Teng and Bryce Peterson. Commencement speakers James Seiner, Xinshan (Molly) Li, and Madison Cox with Professor Stephen DeBacker. Chip Levy with award winner Lawrence Teng. Commencement Reception guests play ping pong and foosball in the Mathematics Atrium.

LOG(M) Offers **Research Opportunities**

The Laboratory of Geometry at Michigan, or LOG(M), is an exciting opportunity for undergraduate and graduate students to work together with faculty to explore and share research topics in geometry and related fields. The program began in Winter 2017, and has involved 13 faculty members, 12 graduate student mentors, and more than 30 undergraduate researchers. Groups work together on specific research projects over the term, and present their findings in a final poster session. Students involved get exposure to and experience in preparing complex mathematical research, and then presenting their findings to a diverse audience.

Right: Undergraduate Noah Luntzlara discusses his project "Visualizing the Schwarzian Derivative." Below: Graduate Student mentor Francesca Gandini with undergraduate researchers John Paul Koenig, Sanjana Kolisetty and Zihui Qi with their project "The Chromatic Number of Flip Graphs.





2018 Undergraduate Awards and Fellowships

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 35th Annual University of Michigan Undergraduate Mathematics Competition Stephen Jasina placed first, Yusuan Bao placed second and Luke Kiernan placed third.

The Barry M. Goldwater Scholarship, a prestigious national recognition, was awarded to Mathematics students Tali Khain, Noah McNeal, and Eric Winsor.

Evelyn O. Bychinsky Awards

Leon P. Zukowski Prize for Math Lab

Jack McLaughlin Award in Algebra

Mathematics Alumni/Alumnae Scholarship

Wilfred Kaplan Award in Applied Mathematics

William LeVegue Award in Number Theory

Frank Raymond Award in Geometry and

George Piranian Excellene in Mathematical

Outstanding Achievement in Mathematics

Sumner B. Myers Award in Analysis

Charles Devlin Noah Luntzlara William Garland Roi Orzach Luke Kiernan Mengxi Wang Jaevoon Kim Xuzhi Zhang

Mentoring

Ryan Britton

Tali Khain

Yifan Wu

Xuenan Li

Eric Winsor

Writing Award

Shiliang Gao

Juntai Zhou

Louisa Abbott

Hai Tran Bach

Wu Han

Elliot (Dean) Young

Topology

Yixi Jiang Thierry Laurens Xinshan Li Jiachang Liu Daniel Minihan Samuel Tenka Ruohan Wu Jia Yanyujia Mingyuan Zhang Sheng Zhong

Bryce Peterson

Nabil Ahmed

Codv Laskowski Sean Russell Jiazhen Yang

Juliet Filbin

Ruifan Liu Marli Henderson

Lawrence Teng

Brvce Peterson Lawrence Teng

Research Rahul Abraham Yuxuan Bao Mark Cappaert Emily Coffield Christopher Hafke Jason Herbst Hannah Moon Ramana Ramanathan Ishpreet Singh Yujia Zhang

Noah Chen Andrew Gitlin Xuenan Li Wanxing Liu Yifan Wu Han Wu

Amanda Burcroff

Alison Elgass

Arthur H. Copland Scholarship Amanda Burcroff

William Garland Ben Dushnik Scholarship Matthew Polgar

Carl Hahn Fischer Scholarship

- Otto C. Richter Prize for Actuarial Science
- Irving Wolfson Award for Actuarial Science
- CIGNA Award for Actuarial Science
- D.W. Simpson Award for Actuarial Science
- Natarajan Family Award for Actuarial Science
- Lois Zook Levy Award for K-12 Teaching
- Michigan Mathematics Merit Scholar
- Margaret S. Huntington Prize in Actuarial
- **Outstanding Graduating Seniors**
- Wirt and Mary Cornwell Prize in Mathematics
- Richard M. and Dorothy L. Carter Scholarship

- Nabil Ahmed Juncheng An Yannis Bi Shijie Cheng Frankie Desmond, IV David Geering Jacob Hall Cody Laskowski Shijia Li Bradley Pineless Thomas Rothwell Sean Russell Yanmeng Song Matthew Stewart Kelcey Talbi Grant Tyburski
- Marilyn and Stewart Glover Scholarship Sarah McNair-Wilson
- Miner S. Keeler Scholarship

Koichi Anderson Yuxuan Bao Robert Buhring Haiming Chen Liam Clancy John Dolan Benjamin Doubek Jeremy D'Silva Maryan El-Hage Scott Guest Keshav Gupta Jonathon Jacobs Cooper James Stephen Jasina Tali Khain Luke Kiernan Max Kontorovich Alec Korotney Owen Langejans Grace Liu Noah Luntzlara James Milleville Grace O'Brien Tayloe O'Hara Jeffrey Ohl Roi Orzach Shankar Prabhu Jason Ross Alexander Saigeon Matthew Sawoski Mohak Saxena Upamanyu Sharma Chance Stephenson Matthew Supran Alexander Tew Ziqi Wang Kenneth Wang Eric Winsor Zheng Yang Ziyi Zhang Virginia McCulloh Scholarship Cameron Derwin William Garland

Actuarial Program Highlights

Actuarial Science is the most valuable college major, according to a most recent report published by Bankrate.com. On top of that, the UM Actuarial Program is one of 31 Centers of Actuarial Excellence in the world.

We held our 16th Annual Nesbitt-Huntington Actuarial Commencement on April 28, 2018 with Howard Bolnick, a 1967 alumnus, as our keynote speaker. The 43 students who graduated during the academic year 2017-18, have passed a total of 84 actuarial exams. We were able to recognize many of our actuarial students with named awards, as listed on the previous page.

Currently, there are 92 students who have declared Actuarial Math as their major. Nineteen of them are majoring in one additional area, and 21 of them have additional minors. The Actuarial Program is encouraging more and more actuarial students to add a business major or minor to their curriculum. A record number (21) of current actuarial students have been accepted by the Ross School of Business.

The Actuarial Program is getting more popular not only within our campus but in many high schools around the country. It is very heartening to know that a record number of high school students have requested more information about our Actuarial Program during their visits to our campus.

I am very proud of the officers of our student club, Student Actuaries at Michigan (SAM). Due to their outstanding efforts, SAM membership has, for the first time, surpassed three hundred (about two hundred of them are freshmen and sophomores).

I am extremely pleased that more than fifty employers are recruiting our very bright actuarial students. We were fortunate to be able to take students for site visits to financial and insurance companies in the Indianapolis area and Metro Detroit.

Our programs and activities could not continue without the generous support and gifts we receive from our alumni/ae and friends. I am very thankful for your contributions. We encourage all the alumni/ae to join University of Michigan Actuaries group in LinkedIn www.linkedin.com/groups/2486220.

> B. Roger Natarajan Actuarial Program Director





Above: Margaret S. Huntington Award winners Mark Cappaert (1) and Ramana Ramanathan (r) with Professor Roger Natarajan. Left: The 2018-19 SAM Board (1-r): Kristen Miele, Nabil Ahmed, Jiazhen Yang, Erica Dawson, Yuan (Vera) Shi, Liam Flynn, Nomin Bat-Otgon, Tom Rothwell, Zhendong Chen, Maxwell Weide, Brad Pineless. Below: I-r Professor Kristen Moore, Ruifan Liu, Colby Laskowski, Juliet Filbin, Bryce Peterson, Xinshan (Molly) Li, Nabil Ahmed, Marli Henderson, Ramana Ramanathan, Professor Roger Natarajan at the Awards Ceremony.

Michigan Reception 2019 Joint Mathematics Meetinas

Michigan Mathematics Alumni and Friends Reception

Thursday, January 17, 2019 5:30 pm to 7:00 pm Brent Room, Hilton Baltimore RSVP to math.mich@umich.edu All are welcome!

Alumni Updates

Ginnie Elizabeth Oliver (MA

1969; AD Mechanical Design, West Wisconsin Technical College and AD Civil Engineering, Mid-State Technical College, 1990) states "While it seems it took me a long round about way to



First row I-r: Tianji Cong (2020) in Agadir, Morocco; Gwyn Moreland, Martha McAlister-Raeburn, Joe Richey, Stella Gastineau, Arthur Özga, Jack Palen, Karl Winsor, and LuLu Wang gather in Boston. Second row l-r: Michelle Ripari (2019) at the Batu Caves, Malaysia: Bryce Peterson (2018) at Halong Bay, Vietman. Third row 1-r: Nikhil Shankar (2021) takes on Sparty at MSU, East Lansing; A group of students at Polytech in Yaounde, Cameroon, who study each year with UM faculty Dan Burns and Nkem Khumbah. Fourth row l-r: Xian Mo in New York; Sam Christensen (2018), Bar Roytman (2017), and Zamar Edwin (2017) eating real ramen in Los Angeles.



Where's Your Math T-shirt Been?



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Watch for our email!

ContinuUM Editorial Board Anthony Bloch, Chair Suzanne Rogers, Editor Andreas Blass Richard Canary Stephen DeBacker Doreen Fussman Mel Hochster Kristen Moore Karen Smith Ralf Spatzier

Photos by UM Photo Services, the Department of Mathematics, or submitted by the individuals.

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 UM 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.

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Medium				
Large				
X-Large				

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