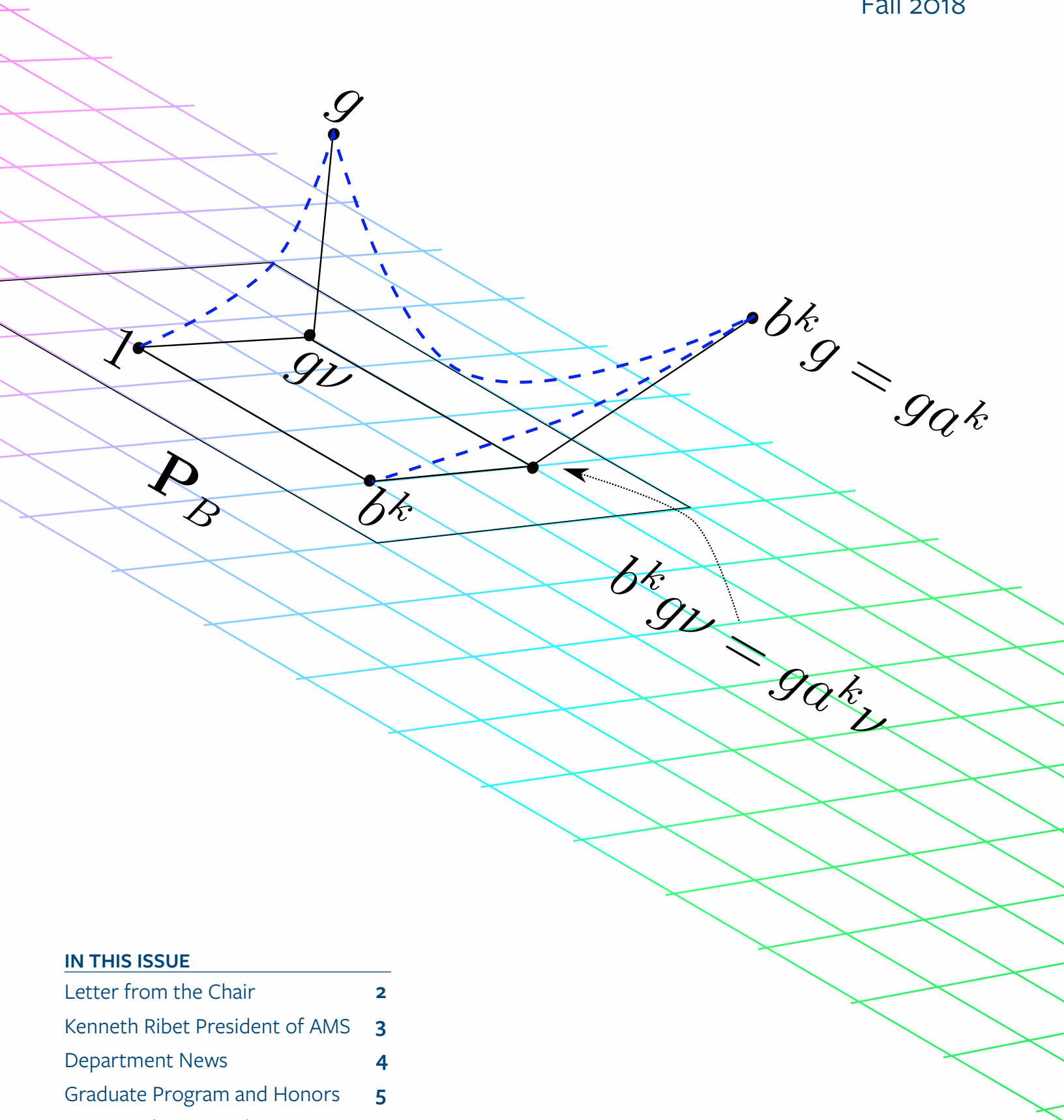


MATHEMATICS + BERKELEY

Fall 2018



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Letter from the Chair



Chair Martin Olsson (PhD, Berkeley, 2001) has been a member of the math faculty since 2006. His research is in algebraic and arithmetic geometry. He became Chair in fall 2016.

Dear Friends of Berkeley Math,

The Berkeley Math Department is an extraordinarily lively and busy place, and I hope you enjoy reading this newsletter wherein we share some of the many activities happening in the department and on campus. This is a time of a lot of change on campus and in the department, and this change brings both significant opportunities as well as challenges for us.

Continuing the pattern of the last several years, demand for our classes continues to grow and students from all across campus take mathematics. We have more than 20,000 enrollments in our classes each year. In addition, the number of majors continues to rise. Last year we passed another milestone in the numbers of majors with more than 1,000 majors at the end of last year. Many students study mathematics for its own sake, but there is also a strong interest in the connections of the subject with other disciplines.

One of the great strengths of our department is the large and outstanding group of graduate students. This past year we welcomed 38 new PhD students in our Department. Vice Chair Wilkening writes more about the graduate program on page 5. Our graduate students contribute in many significant ways to both the research and teaching missions of the department, and have strong placements in both academia and industry.

We also have strong connections with children in K-12 through the work of the Berkeley Math Circle. In addition, we hosted our annual Julia Robinson Math Festival at Berkeley on Saturday, Nov 10. If you know a student in grades 6-10, check out JRMF.org for more information and mark your calendar for a visit to campus next fall.

The research of the faculty is, of course, at the heart of the success of the department. In the most recent *U.S. News and World Report* ranking of mathematics graduate programs, which was conducted in 2018, the department was ranked in a tie for second. Moreover, our department was ranked first in 3 out of the seven subspecialties ranked. Maintaining this level of excellence in research is one of the principal challenges for the future. I also want to highlight here the importance to our research mission of our postdoctoral program and our ties with the Mathematical Sciences Research Institute (MSRI), Lawrence Berkeley National Laboratory (LBNL), and the Simons Institute for the Theory of Computing. The Berkeley Mathematics Department is part of a lively ecosystem of mathematical sciences on campus.

I am delighted to report that this past year we made two new ladder faculty hires. Suncica Canic joins the department this fall as a Full Professor, and you can read more about her work on page 7. Sung-jin Oh will join the department next year as a new Assistant Professor.

I want to take this opportunity to thank the many individuals who support the department in a variety of ways. The support of donors is indispensable for the success of the department. Donor funding supports a wide variety of activities impacting all members of the department community, and is indispensable for us to maintain the vibrant community in the department.

This past year we have seen a number of retirements and new additions among our staff. I want to especially acknowledge Mary Pepple. Mary retired this past summer after 15 years of service in the department and 30 years of service to Berkeley. Her service contributed greatly to the success of the department over the last several years. You can read more about the new members among the department staff on page 7. I also want to take this opportunity to thank the vice chairs Olga Holtz, Nicolai Reshetikhin, Fraydoun Rezakhanlou, and Jon Wilkening for their continued service to the department.

Finally, I encourage you to stay connected with the department and Berkeley. You can learn more about the many activities in the Department on [our homepage](#) and the [UC Berkeley Mathematics Facebook page](#) and join current and former students in the [UC Berkeley Mathematics LinkedIn group](#).



Vice Chairs Nicolai Reshetikhin, Jon Wilkening and Olga Holtz

Berkeley Professor is President of AMS

Professor Kenneth Ribet shares thoughts on his term



Professor Kenneth Ribet, AMS President
(Photo: Seo-Yeon Lee)

It is my pleasure and honor to write this column as President of the American Mathematical Society. I was elected in the fall of 2015, became President-elect a few months later and began my two-year term as President on February 1, 2017.

I have *loved* being President and hope that my efforts have had a positive impact on the mathematics community.

I first learned about the AMS during the summer that I spent on the campus of Brown University after my junior year of high school. Although

it was founded as the “New York Mathematical Society” in 1888, our Society became the *American* Mathematical Society later on. It moved to Providence, RI, where Brown is located, in 1951. I remember making a pilgrimage to the AMS office during a break between our summer classes at Brown.

I joined the AMS as a graduate student and have been a member for roughly forty-five years. I’m now a *life member* of the Society. Although I have given invited addresses at AMS meetings over the years, and even served on various prize committees, I did not become involved in AMS governance until I was elected to the AMS Council in 2012. Over the last seven years, I’ve gotten to know the inside of the Society; at the same time, I’ve learned quite a bit about issues facing the mathematics profession. When I was invited four or five years ago to run for President, I accepted enthusiastically. Many months later, I felt a jolt of electricity when I received the news that I had been elected!

My presidency began with a good measure of turmoil because I served as AMS President-elect at the same time that Donald Trump occupied the analogous position from his perch in the Trump Tower. After the inauguration of the new American President, the AMS joined other professional societies in statements concerning the Immigration Ban, the March for Science and other matters. Although disruption is the new normal in Washington, the Office of Government Affairs of the AMS (located in Washington, DC) has done a superb job representing the mathematical community on Capitol Hill and in Federal agencies like the National Science Foundation and the Department of Education. As President, I have visited our nation’s capital repeatedly for AMS policy committees, our twice-per-year Congressional Briefings and meetings with lawmakers as well as those members of the Trump administration who have been willing to engage with the science community.

The responsibilities of the AMS President vary from day to day. I’m frequently asked for my opinion on a policy issue or to weigh in on questions that have bubbled up inside the AMS or in the mathematics community. The President has the responsibility to make appointments to a plethora of editorial and governance committees of the Society. I am an ex-officio member of the Board of Trustees, which ensures financial solvency of the Society. I sit on numerous committees that choose key journal editors and staff members. As President, I joined a selection committee that choose the new AMS logo, as well as the tag line that appears underneath.

I’ve especially enjoyed serving as co-chair for the AMS’s “Next Generation Fund.” The fund grew out of a challenge set by an individual known inside the AMS as the Anonymous Donor. For years, this generous person has been funding activities like travel grants for graduate students through large annual donations to the AMS. He recently announced that he will match up to 1.5 million dollars in contributions and pledges, with the aim of inaugurating an endowment of at least \$3m. Although the fundraising effort is still in its quiet phase, we reached 2/3 of our goal in September. The fund will be announced officially at the annual AMS meeting in mid-January.

As a representative of the AMS, I’ve done a jaw-dropping amount of international travel. In recent months, I was invited to the joint meeting of the American and Chinese mathematical societies at Fudan University in Shanghai and the joint meeting of the German and South Korean mathematical societies in Seoul. During the summer, I served as a member of the US delegation to the General Assembly of the International Mathematical Union, which met in São Paulo a few days before the International Congress of Mathematicians in Rio de Janeiro. Next summer, I am slated to represent the AMS at the joint meeting of the American and Vietnamese mathematical societies at Quy Nhon University in Quy Nhon City.

An unmitigated pleasure of the AMS Presidency has been my interactions with mathematicians both inside and outside the AMS. I have met many of the roughly 235 AMS’s staff members. The executive staff of the Society, beginning with Executive Director Catherine Roberts and the Associate Executive Directors, have been wonderful colleagues during my term of office. Members of the AMS leadership have taught me about our profession and our community. I owe a great debt to all of these people and hope that they have enjoyed working alongside me.

After I pass the AMS baton to Jill Pipher of Brown University at the end of January, I will miss the multi-faceted and deep engagement with the mathematical profession that the AMS Presidency has afforded me.



DEPARTMENT NEWS

Distinguished Lectures

- The 2017-18 Serge Lang Lecture was given on November 2, 2017 by **Keith Devlin** of Stanford University, with a lecture entitled “*When the precision of mathematics meets the messiness of the world of people.*”
- The 2017-18 DiPerna Lecture was given on January 25, 2018 by **Wilhelm Schlag** of University of Chicago, with a lecture entitled “*On the long-term dynamics of nonlinear dispersive evolution equations.*” The 2018-2019 DiPerna Lecture will be given on January 31, 2019, by **Gunther Uhlmann** of University of Washington.
- The 2017-18 Chern Lectures were given on March 20-23, 2018 by **Martin Hairer** of the University of Warwick, with a series entitled “*Singular Stochastic PDEs.*” The 2018-2019 Chern Lectures will be given on March 12, 13, 14 and 15, 2019, by **Assaf Naor** of Princeton University.
- The 2017-2018 Bowen Lectures were given on February 7, 8 and 9, 2018 by Avi Wigderson of the Institute for Advanced Study, on “*Mathematics and Computation (through the lens of one problem and one algorithm.*” The 2018-2019 Bowen Lectures will be given

by **Christopher Hacon** of University of Utah and **James McKernan** of MIT.

Faculty Honors

- Professor **Antonio Montalban** received a 2018 Simons Fellowship in Mathematics.
- Professor **Bernd Sturmfels** won the 2018 George David Birkhoff Prize in Applied Mathematics.
- Professor **James Demmel** was elected to the American Academy of Arts and Sciences.
- Assistant Professor **Semyon Dyatlov** won the International Association of Mathematical Physics Early Career Award.
- Professor **Daniel Tataru** gave the 2018 Felix Klein Lectures, and was appointed for a second term as Simons Investigator.
- Professor **Maciej Zworski** received a Doctor Honoris Causa from Université Paris-Sud.
- Professor **Song Sun** was awarded the 2019 Oswald Veblen Prize in Geometry.

In Memoriam



Professor Emeritus Grigory I. Barenblatt

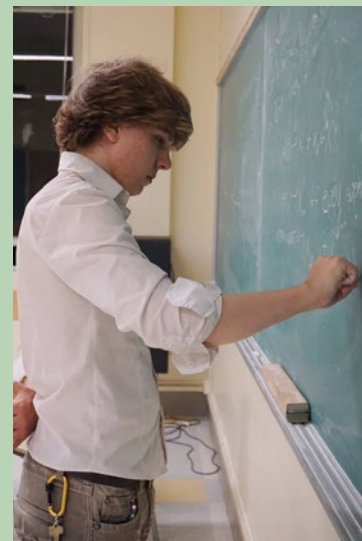
Prof. **Grigory Isaakovich Barenblatt** (1927-2018) was born in Moscow on July 10, 1927, and studied mathematics at Moscow University under the supervision of A.N. Kolmogorov and B.M. Levitan. He went on to become one of leading applied mathematicians world-wide, with extraordinary contributions to a broad variety of fields, including fluid mechanics, turbulence, flow in porous media, fracture, materials science, scaling, asymptotics and intermediate asymptotics. He joined the Mathematics Department of the University of California, Berkeley, in 1996 as a Professor in Residence, with a concurrent appointment at the Lawrence Berkeley Laboratory.

Professor Barenblatt held appointments as a foreign honorary member at the U.S. National Academy of Sciences, the U.S. National Academy of Engineering, the American Academy of Arts and Sciences, and the Royal Society of London, as well as a long list of other professional societies in multiple countries.

The long list of his awards includes the G.I. Taylor award from the US Society for Engineering Science, the Maxwell Prize of the International Committee on Applied and Industrial Mathematics, the Lagrange Prize of the Accademia Nazionale dei Lincei, and the Timoshenko Award of the ASME.

Jonathan J. Gleason (1989-2018), known to many as Jonny, was a PhD candidate studying theoretical and mathematical physics under Professor Marc Rieffel. Prior to joining the Mathematics Department at Berkeley, he earned a Master's degree in Applied Mathematics from Cambridge University in Cambridge, England. He completed his undergraduate studies at the University of Chicago in Chicago, Illinois where he graduated with honors in both Physics and Mathematics. Jonny's research focused on developing mathematical techniques that would contribute to the effective modeling of quantum physics. He had creative ideas on how to generalize basic structures in commutative algebra to non-commutative algebras.

Not only was Jonny recognized as an exemplary student himself, he was one of the most loved Graduate Student Instructors in the Mathematics Department. He was so committed to teaching that he created his own instructional materials and course texts. His love for the subject inspired others to think beyond the material being presented and have a better understanding of the why and how in mathematics.



PhD student Jonathan J. Gleason

GRADUATE PROGRAM NEWS

Our graduate program remains one of the top-rated graduate programs worldwide (tied for 2nd in the most recent *U.S. News and World Report* ranking of math graduate programs), and the top graduate program among public universities in the United States. The excellence, energy, and creativity of our graduate students continue to be key success factors for the department in research and teaching. This past year we welcomed 38 new PhD students (30 Pure, 5 Applied, 3 Logic) to our program, 21 of whom were international students. This cohort was selected from an extraordinarily talented group of applicants, and includes some of the most promising young mathematicians in the country and world. Last year we awarded 28 PhDs and 8 Masters degrees. Many of these degree recipients went on to academic postdoctoral positions in mathematics, including prestigious positions at many of the top institutions around the world. We also saw several of our graduate students take their mathematical skills into industry positions. Our graduate students have won numerous awards and fellowships; several of them were also honored with departmental prizes at last year's commencement ceremony.



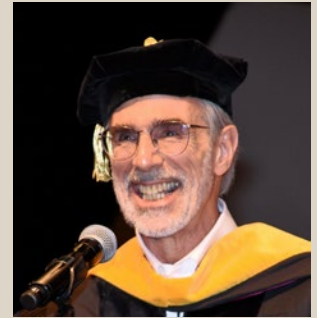
Professor Jon Wilkening, Vice Chair for Graduate Affairs

Graduate Student Honors

- **Chris Gerig** and **Nicholas Ramsey** received the 2017-18 Herb Alexander Prize, awarded for outstanding dissertations in pure mathematics.
- The 2017-18 Bernard Friedman Memorial Prize in Applied Mathematics was awarded to **Michael Lindsey**.
- **Brandon Williams** and **Alex Zorn** received the Kenneth Ribet & Lisa Goldberg Award in Algebra.
- **Qiaochu Yuan** was awarded the 2017-18 Nikki Kose Memorial Teaching Prize.
- **Benson Au, Franchesca Cavagnaro, Kat Christianson, Kubrat Danailov, Daniel Hermes, Jeffrey Hicks, Kenneth Hung, Bo Li, Patrick Lutz, Pearl Ranchal, Sierra Reyburn, James Robertson, Isabelle Shankar, Melissa Sherman-Bennett, Joseph Stahl, Jianwei Xiao, and Jiefu Zhang** received 2017-2018 Outstanding Graduate Student Instructor Awards.

2018 Commencement

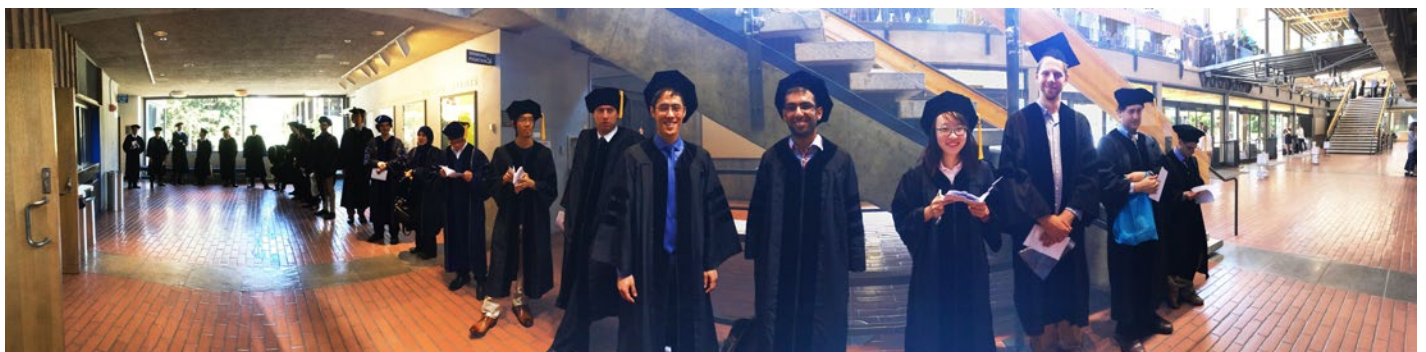
The Department of Mathematics' 2018 Commencement Ceremony took place on May 17th in Zellerbach Auditorium. This year's commencement speaker was David Eisenbud, Director of Mathematical Sciences Research Institute and Professor of Mathematics at UC Berkeley. The ceremony saw 356 mathematics and applied mathematics majors receive undergraduate degrees, while 27 graduate students received Masters and PhDs; a number of departmental prizes (both graduate and undergraduate) were also awarded during the ceremony.



Professor David Eisenbud
(Photo: GradImages)

Undergraduate Student Honors

- Class of 2018 Valedictorian **Eric Y. Chen** was awarded the 2017-2018 Departmental Citation and the 2018 Paul Chernoff Memorial Prize.
- **Srivatsav Kunnawalkam Elayavalli, Hy Pham Gia Lam, Cailan Li, Clark Lyons, Maryann Rui, Sameera Vemulapalli, Lingxian Zhang, Long Zhao, and Zirui Zhou** were awarded the Dorothea Klumpke Roberts Prize in Mathematics in recognition of their truly exceptional scholarship.
- **Katherine Anderson, Minjun Chang, Abhishek Dhawan, Nicholas Ward, Tianhe Yu, and Ziyang Zhou** were awarded the Percy Lionel Davis Award for Excellence in Scholarship in Mathematics.
- Congratulations to **Junhao Fan** for finishing in the Top 25 in the 2017 William Lowell Putnam Mathematical Competition, and to **Brian Burks** and **Jonathan Xia** for earning Honorable Mention honors. Other UC Berkeley students finishing in the top 200 (out of 4,638 competitors) were **Jiannan Jiang, Brian Liu, and Yuanning Zhang**. UC Berkeley had more students place in the top 500 than any other public school in the United States.
- **Sameera Vemulapalli** was named Runner-Up for the 2018 Schafer Prize sponsored by the Association of Women in Math.



(Photo: Vicky Lee)

Congratulations to our students who received their PhDs this past academic year!

Shishir Agrawal “Deformations of overconvergent isocrystals on the projective line” under David Nadler. Shishir is now a Visiting Assistant Professor at Colorado College.

Benson Au “Rigid structures in traffic probability: with a view toward random matrices” under Steven Evans. Benson is now a Stefan E. Warschawski Visiting Assistant Professor at UCSD.

Justin Brereton “A method of constructing invariant measures at fixed mass” under Daniel Tataru. Justin is now a Quantitative Analyst at Susquehanna International Group.

Harrison Chen “A Localization Theorem for Derived Loop Spaces and Periodic Cyclic Homology” under David Nadler. Harrison is now an H.C. Wang Assistant Professor at Cornell University.

Kun Chen “On Stability and Doctor-optimality of Cumulative Offer Process” under Christina Shannon.

Yi-chang Chen “On Betti Tables, Monomial Ideals, and Unit Groups” under David Eisenbud. Yi-chang is now a Post-doc at Georgia Tech.

Chris Anthony Gerig “Seiberg-Witten and Gromov invariants for self-dual harmonic 2-forms” under Michael Hutchings. Chris Anthony is now an NSF Postdoctoral Fellow at Harvard University.

Bryan Gillespie “The Generalized External Order, and Applications to Zonotopal Algebra” under Olga Holtz.

Daniel Hermes “High-order Solution Transfer between Curved Meshes and Ill-conditioned Bézier Curve Intersection” under Per-Olof Persson.

Alexander Kocurek “What Can You Say? Measuring the Expressive Power of Languages” under Wesley Holliday and Seth Yalcin. Alexander is now an Assistant Professor of Philosophy in the Sage School of Philosophy at Cornell University.

Watson Bernard Ladd “Algebraic Modular Forms on $SO_5(\mathbb{Q})$ and the Computation of Paramodular Forms” under Kenneth Ribet. Watson is now a Cryptography Engineer at Cloudflare.

Ruo Chen Liang “Fast and Stable Low-Rank Symmetric Eigen-Update” under Ming Gu. Ruo Chen is now a Research Scientist at Facebook.



Grace Liu “Modified scattering for small data solutions to the cubic Schrödinger equation on product space” under Daniel Tataru.

Daniel Lowengrub “Applications of the Intersection Theory of Singular Varieties” under Vivek Shende. Daniel is now a Software Engineer at drive.ai.

Shelly Manber “Asymptotics of the Tate-Shafarevich Group” under Xinyi Yuan. Shelly is now a Faculty at Proof School.

Anh Martina Neuman “Functions of nearly maximal Gowers-Host-Kra norms on Euclidean spaces” under Michael Christ. Anh Martina is now a Post-doc at NYU Shanghai.

Christopher Policastro “Integral estimates for approximations by incompressible deformations” under Fraydoun Rezakhanlou (graduated spring 2017). Christopher is now at RBC Capital Markets.

Saad Qadeer “Simulating Nonlinear Faraday Waves on a Cylinder” under Jon Wilkening. Saad is now a Post-doc at the University of North Carolina.

Samuel Nicholas Ramsey “Independence, Amalgamation, and Trees” under Thomas Scanlon. Samuel is now a Hedrick Visiting Assistant Professor at UCLA.

Wolfgang William Schmalz “Gromov-Witten Axioms for Symplectic Manifolds via Polyfold Theory” under Katrin Wehrheim. Wolfgang is now a Research Fellow at Justus-Liebig-Universität Gießen.

Tao Su “A Hodge-theoretic study of augmentation varieties associated to Legendrian knots/tangles” under Richard Borcherds and Vivek Shende. Tao is now a Post-doc at ENS and Jussieu Institute of Mathematics in Paris.

Thunwa Theerakarn “Locally Volume Collapsed 4-Manifolds with Respect to a Lower Sectional Curvature Bound” under John Lott. Thunwa is now a Visiting Assistant Professor at UC Riverside.

Franco Eloy Vargas Pallete “On Renormalized Volume” under Ian Agol. Franco is now a Post-doc at the Institute for Advanced Study, Princeton.

Brandon Thomas Williams “Computing modular forms for the Weil representation” under Richard Borcherds. Brandon is now a Post-doc Researcher at TU Darmstadt.

Patrick Farrell Wilson “Asymptotically Conical Metrics and Expanding Ricci Solitons” under John Lott.

Qiaochu Yuan “Convergence Analysis of Randomized Block Lanczos Algorithms for Low-Rank Matrix Approximations” under Ming Gu. Qiaochu is now a Research Scientist in Applied Machine Learning at Facebook.

Zhengyi Zhou “Morse-Bott and Equivariant Theories Using Polyfolds” under Katrin Wehrheim. Zhengyi is now a Post-doc at the Institute for Advanced Study in Princeton.

Alexander W. Zorn “A Combinatorial Model of Lagrangian Skeleta” under David Nadler.

New Faculty



Suncica Canic

Professor Suncica (Sunny) Canic comes to Berkeley from the University of Houston, where she was the only woman to hold the Cullen Distinguished Chair Professorship position. She works in applied mathematics, nonlinear partial differential equations, and computational methods development. She earned her PhD in 1992 in the area of nonlinear hyperbolic conservation laws from the Department of Applied Mathematics and Statistics at Stony Brook University under the supervision of Bradley Plohr and James Glimm. Upon her move to the University of Houston in 1999, she began collaborating with several medical specialists on problems related to cardiovascular treatment and diagnosis. She was honored for her research by the National Science Foundation as Distinguished MPS Lecturer in 2007, she received the US Congressional Recognition for Top Women in Technology in 2006, and the most prestigious award at the University of Houston, the Esther Farfel Award in 2018. Canic was also invited to

present a Congressional Briefing on Capitol Hill in 2011. In 2014 she was elected Fellow of the Society for Industrial and Applied Mathematics. Her research influenced the design of a stent for a bio-artificial aortic valve, now used in patients around the world.

Faculty Promotions

Professor **Antonio Montalban** was promoted to Full Professor.

Professor **Xinyi Yuan** was promoted to Associate Professor.

New Morrey Visiting Assistant Professors

Semeon Artamonov (Representation theory, topological quantum field theory, and noncommutative geometry), PhD Rutgers University, 2018.

Koji Shimizu (Number theory and algebraic geometry), PhD Harvard University, 2018.

Dmitry Vaintrob (Algebraic geometry, mirror symmetry, topology), PhD MIT, 2016.

Xuwen Zhu (Microlocal analysis, differential geometry, PDEs), PhD MIT, 2015.

New Visiting Faculty and Postdocs

Dan Bragg (Algebraic geometry, positive characteristic), PhD University of Washington, 2018. RTG Postdoc.

Ian Charlesworth (Free probability and operator algebras), PhD UCLA, 2017. NSF Postdoctoral Scholar.

David Corwin (Arithmetic geometry, arithmetic topology), PhD MIT, 2018. RTG Postdoc.

Wilfrid Gangbo (Non-convex optimization, functional analysis, nonlinear PDEs), Chancellor's Professor.

Georgios Moschidis (General relativity, PDEs, differential geometry), PhD Princeton University, 2018. Miller Fellow.

Yifan Wang (Numerical methods, computational fluid dynamics), PhD Louisiana Tech, 2014. Postdoctoral scholar.

Xiaojie Wu (Molecular dynamics, electronic structure calculation), PhD Penn State, 2018. Postdoctoral scholar.

Leonardo Zepeda-Núñez (Computational math, numerical analysis, machine learning), PhD MIT, 2015. Postdoc scholar.

Staff news

Over the last year the Department had both comings and goings of staff members. Staff departures included **Mary Pepple** who retired from her post as Department Manager after many years of service. Senate Academic Personnel Analyst, **Emma Lindley**, accepted a position in the school of law. Research Administrator **Kristin Mendoza-Fabiani** left Berkeley to work at UC Davis in a similar role; and **Ana Renteria**, Undergraduate Academic Advisor, relocated to Southern California to be closer to family.

In another change, seasoned staff member **Jennifer Pinney's** role has evolved to Curriculum Analyst & Honors Program Advisor.

Four new staff members were welcomed to the Math Department community since July 2018. Senate Academic Personnel Analyst **Amy Gonsalves** came to the Department from the Campus Budget Committee Office. **Blaine Jones**, Undergraduate Academic Advisor, joined Mathematics from the Department of Film & Media as well as the Rhetoric Department, where he worked with advising and curriculum scheduling. **Christine Tobolski** the new Director of Student Services joined the Department in October 2018. She formerly served at Berkeley in student services and curriculum scheduling capacities for over 7 years in the College of Natural Resources. Furthermore, **Holli Griffin Strauss** filled the Department Manager vacancy left by **Mary Pepple**. Holli previously managed the Travers Department of Political Science at UC Berkeley.

Lastly, in September 2018, Student Affairs Officer **Marsha Snow** celebrated 26 years of service working in the Math Department, and the math department staff team, "The Mathletes", took 3rd place in an all Campus Staff Scavenger Hunt during Staff Appreciation Week.

MATHEMATICS + BERKELEY

FALL 2018 NEWSLETTER



Entering class of graduate students 2018 (Photo: Vicky Lee)

A Note on Strategic Priorities

The Department of Mathematics is working hard to maintain its excellence in all aspects of research and education and to bridge the resource gap that separates us from our better-funded peers. For this we continue to rely on donations from alumni and friends of the department. Here are some of the department's current top priorities:

- **Graduate Student Fellowships** are needed to enable the department to make competitive, attractive offers to the very strongest applicants to our graduate program, who are often being lured by our private peers with offers of higher stipends and lower teaching loads.
- **Endowed Faculty Chairs** are needed in order to improve the department's ability to make competitive offers for the recruitment and retention of world-class faculty.
- **Research Visitor Funds** make it easier to invite high-profile visitors to come to Berkeley to deliver lectures in our department or collaborate with our faculty. These intellectual exchanges are of tremendous value to our research and education.

Besides these specific goals, we welcome gifts to the department's discretionary fund, which give the Chair of the department much-needed flexibility in funding graduate student recruitment, parts of the faculty recruitment process, research travel for graduate students, and many other initiatives that make our program competitive and rewarding.

We invite you to join us in keeping UC Berkeley Mathematics strong through your gifts to the department. All donations, large or small, are greatly valued. You may choose whether to direct your gift toward a specific goal of your choice or to have your donation used for our most pressing needs at the department's discretion.

For further information, please contact Development Directors Nicholas Cole, e-mail: ncole@berkeley.edu or Maria Hjelm, e-mail: mhjelm@berkeley.edu, or Department of Mathematics Chair Prof. Martin Olsson, e-mail: chair@math.berkeley.edu.

Newsletter Contributors: Editor: Per-Olof Persson. Thanks to Martin Olsson, Monica Albe, Carolyn Abbott, Jon Wilkening, Vicky Lee, Jennifer Pinney, and Holli Griffin Strauss. Photography: mostly George Bergman. Cover: Carolyn Abbott, illustration of flats and hierarchy paths in the Cayley graph of a hierarchically hyperbolic group.

MATHEMATICS + BERKELEY

The Department of Mathematics wishes to thank all alumni, parents, students, faculty, staff and friends who support the department.

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- Please direct my gift to the Department of Mathematics Annual Fund, to be used for the Department's greatest need at the Chair's discretion (Fund #N7221).
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- Send me information on charitable estate and gift planning or on establishing an endowment.

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Please provide your e-mail address so we can send you future issues of this newsletter.

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The information you provide will be used for University business and will not be released unless required by law. A portion of all gifts is used to defray the costs of administering the funds. All gifts are tax-deductible, as prescribed by law.

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