

Mathematics People

Melnick Awarded Birman Fellowship



Karin Melnick

Karin Melnick of the University of Maryland, College Park, has been awarded the AMS Joan and Joseph Birman Fellowship for Women Scholars for the academic year 2020–2021. Melnick’s research is on differential-geometric aspects of rigidity. This work comprises global and local results relating the automorphisms of a differential-geometric structure with the geometric and topological prop-

erties of the space. Melnick also works in smooth dynamics, in which an invariant differential-geometric structure plays an important role in the proof of rigidity theorems. Melnick is a leader in research on the Lorentzian Lichnerowicz conjecture, a statement about conformal transformations of compact Lorentzian manifolds. Together with collaborators, she has developed new techniques in the setting of Cartan connections that have facilitated progress on this problem, as well as many results for other differential-geometric structures and general parabolic Cartan geometries.

Karin Melnick was born and raised in the San Francisco Bay area. She attended Reed College in Portland, Oregon, and completed her PhD at the University of Chicago in 2006 under the direction of Benson Farb. With an NSF Postdoctoral Research Fellowship, she went to Yale University as a Gibbs Assistant Professor. She received a Junior Research Fellowship from the Erwin Schrödinger Institute in the spring of 2009 and began as an assistant professor at the University of Maryland in the fall of 2009. She has been awarded an AMS Centennial Fellowship and an NSF CAREER grant. She is currently associate professor at the University of Maryland.

Melnick lives between the United States and Germany with her partner and their young child. She is very grateful for the flexibility provided by the Birman Fellowship and the opportunities it provides to advance her research and career goals.

The AMS Joan and Joseph Birman Fellowship for Women Scholars, established in 2017 with a generous gift from Joan and Joseph Birman, seeks to give exceptionally talented women extra research support during their mid-career years. The first three Fellowships are also being supported by the Stephen and Margaret Gill Family Foundation, in memory of Hilda Geiringer von Mises. The primary selection criterion for the Birman Fellowship, which carries a stipend of US\$50,000, is the excellence of the candidate’s research. Read an interview (www.ams.org/giving/honoring/the-line-newsletter-fall2017-PDF.pdf) with Joan Birman about her decision to create the Fellowship with the goal of “helping more women mathematicians to develop their creative voices.”

The first two Birman Fellows were Margaret Beck (2018–2019) and Lillian Pierce (2019–2020). For more information about the Fellowship, see www.ams.org/profession/prizes-awards/Birman-Fellowship.

—Elaine Kehoe

Khayutin Awarded 2020–2021 Centennial Fellowship



Ilya Khayutin

Ilya Khayutin of Northwestern University has been awarded the AMS Centennial Fellowship for the academic year 2020–2021.

Khayutin tells the *Notices*: “I work in homogeneous dynamics and number theory. The interface between these fields is vast, so let me give a special example to demonstrate the type of questions I have been studying. Consider a degree n totally real irreducible integral polynomial P of discriminant D . We are interested in solutions to $P(X)=0$ when X is an $n \times n$ matrix. The space of these solutions is a nice algebraic variety V_P . This variety carries an action of the group PGL_n by conjugation. The solutions in real matrices, $V_P(\mathbb{R})$, are a *homogeneous* space for $\mathrm{PGL}_n(\mathbb{R})$, simply because each semisimple real matrix with real eigenvalues can be diagonalized over the reals. This observation allows us to identify

$V_p(\mathbb{R})$, for any degree n polynomial P as above, with the coset space $\mathrm{PGL}_n(\mathbb{R})/A$, where A is the subgroup of diagonal matrices. A classical question going back to Linnik is how do the solutions in integral matrices, $V_p(\mathbb{Z})$, distribute in the space of real solutions $\mathrm{PGL}_n(\mathbb{R})/A$ when one varies the polynomial P (the degree n is fixed). In many cases we expect the distribution of the discrete points $V_p(\mathbb{Z})$ to be close to uniform when $|D|$ is large enough.

“For $n=2$ this question was partially answered by Skubenko in the 1950s using a method due to Linnik. The $n=2$ case was finally resolved by Duke in the 1980s. While Linnik’s method relied on an intricate interplay between dynamics and arithmetic, Duke’s proof belongs to the theory of automorphic forms and builds upon Iwaniec’s amplification method. The case of higher n ’s seems to be much harder. The question was solved for $n=3$ by Einsiedler, Lindenstrauss, Michel, and Venkatesh after the turn of the twenty-first century using a method inspired by Linnik’s work. The input they required both on the ergodic and the number theory sides is significantly more involved than for $n=2$. The case of $n>3$ is still very much open, although some weak partial results are known. It would be pleasing to see a solution of this problem in general.

“This is one flavor of questions I enjoy, some other problems are related to the asymptotic behavior of automorphic forms in various aspects. For example, how big can the sup-norm of a Hecke–Maass eigenform of large Laplace eigenvalue on the modular curve be when restricted to a fixed compact set. The study of these problems has been pioneered by P. Sarnak, and important deep theorems have been proven by many researchers. I find it especially beautiful when we find a common thread between these spectral problems and the Diophantine problems above.”

Khayutin was born in the Soviet Union; his family immigrated to Israel when he was five years old. He received his PhD in 2016 from Hebrew University under the direction of Elon Lindenstrauss. He was a Veblen Research Instructor at Princeton University and the Institute for Advanced Study from 2016 to 2019. He says, “My parents played a formative role in my education and my interest in science, and I am very fortunate to have a wonderful family. Although I was deeply interested in mathematics at an early age, it was not till my late twenties when I have decided to pursue a career in math. Since coming full circle to graduate studies in mathematics my passion about the subject continuously grows.”

The Centennial Fellowship carries a stipend of US\$93,000, a travel expense allowance of US\$9,300, and a complimentary Society membership for one year. The award was made at the recommendation of the Centennial Fellows Selection Committee. The primary selection criterion is the excellence of the candidate’s research.

Please note: Information about the competition for the 2021–2022 AMS Centennial Fellowship will be published

in the “Mathematics Opportunities” section of an upcoming issue of the *Notices*.

—Elaine Kehoe

2020 Rolf Schock Prizes Awarded

Nikolai G. Makarov of the California Institute of Technology has been awarded the 2020 Rolf Schock Prize in Mathematics “for his significant contributions to complex analysis and its applications to mathematical physics.” According to the prize citation, complex analysis “investigates functions of complex variables. This field is vital to many branches of mathematics and has numerous applications in the natural sciences and engineering.”

The citation reads in part: “His most famous results concern harmonic measure in two dimensions, stating that the hitting probability distribution on the boundary for Brownian motion in two-dimensional, simply connected domains (domains without holes) is one-dimensional. Brownian motion is the random movement of small particles floating in a fluid or gas, which was studied by Albert Einstein in the early twentieth century.

“Nikolai Makarov has also made revolutionary contributions in the field of growth phenomena that describe crystal growth in a two-dimensional space. In recent years, he has also produced innovative results in conformal field theory in quantum mechanics, particularly its relationship to complex analysis and probability theory.” Makarov received his doctorate from the Steklov Mathematical Institute in Leningrad in 1986. He is a past recipient of the Salem Prize and was an invited speaker at the International Congress of Mathematicians in Berkeley in 1986.

Dag Prawitz and Per Martin-Löf, both of Stockholm University, were awarded Rolf Schock Prizes in Logic and Philosophy. They specialize in proof theory and constructivist philosophy of mathematics. Prawitz was recognized for his work in “proof-theoretical normalization in natural deduction,” and Martin-Löf was honored “for the creation of constructive type theory.”

The prize carries a cash award of 400,000 Swedish krona (approximately US\$39,000). The prizes are awarded in the areas of mathematics, logic and philosophy, visual arts, and music.

—From a Schock Prize announcement

Bandeira Awarded Smale Prize



Afonso Bandeira

Afonso Bandeira of ETH Zurich has been awarded the fourth Stephen Smale Prize “for his pioneering work on the foundations of computational mathematics.” The citation states: “Bandeira is an incredibly productive and versatile researcher who has successfully applied and combined concepts and tools from optimization theory, probability theory, information theory, statistics, theoretical

computer science, harmonic analysis, and number theory to the design and analysis of algorithms for solving real-life data science problems.”

Bandeira received his PhD in applied and computational mathematics from Princeton University in 2015 under the direction of Amit Singer. He held positions at the Massachusetts Institute of Technology (2015–2016) and the Courant Institute of Mathematical Sciences (2016–2019) before joining the faculty at ETH Zurich, where he is a full professor. He was awarded a Sloan Research Fellowship in 2018 and is a recipient of the ISAAC Award for Young Scientists from the International Society for Analysis, Its Applications, and Computation.

The Society for the Foundations of Computational Mathematics (FoCM) awards the Smale Prize every three years to a researcher who has received his or her doctoral degree in the previous ten years. The prize recognizes major achievements in furthering the understanding of the connections between mathematics and computation. For further information, see http://focm-society.org/smale_prize.php.

—FoCM announcement

Bedrossian Awarded 2019 IMA Prize



Jacob Bedrossian

Jacob Bedrossian of the Center for Scientific Computation and Mathematical Modeling at the University of Maryland, College Park, has been awarded the 2019 IMA Prize of the Institute for Mathematics and Its Applications (IMA) for his important contributions to the study of partial differential equations of fluid dynamics and in particular to the area of hydrodynamic stability.

According to the prize citation, Bedrossian’s research focuses on stability and coherent structures in fluid mechanics and plasma physics. His accomplishments include remarkable results on the stability of shear flows. Currently, his “major focus is on laying down mathematically rigorous foundations for the theories of turbulence in the physics literature. ‘Turbulence’ refers to the chaotic creation of small features in a fluid, for example, the complexity and unpredictability in a cloud of smoke rising from a smokestack. The physical theories make predictions that seem correct or at least not far off when compared to experiments. However, it is currently not understood how to deduce these ‘laws’ directly from the mathematical equations without adding in additional empirical assumptions, assumptions that one has no idea how to prove mathematically from the equations, but which seem to be approximately true in experiments. Recently, together with Alex Blumenthal and Sam Punshon-Smith, Bedrossian verified one of the simplest of such laws in a certain range of physical settings. The effort required to verify this simplified law was substantial, involving four separate papers that draw ideas from several fields of mathematics.”

Bedrossian received his PhD in 2011 from the University of California, Los Angeles. He has held a Sloan Research Fellowship (2015) and an NSF CAREER grant (2016–2021). He was awarded the inaugural Peter Lax Award from the International Conference on Hyperbolic Problems in 2020. He has been awarded a 2020 Simons Fellowship and will be spending the 2020–2021 year at the Courant Institute of Mathematical Sciences.

The prize consists of a certificate and a cash award of US\$3,000. The prize is awarded annually to a mathematical scientist who received his or her PhD degree within ten years of the nomination year. The award recognizes an individual who has made a transformative impact on the mathematical sciences and their applications.

—From an IMA announcement

Ardakov and Wemyss Awarded Adams Prize



Konstantin Ardakov

Konstantin Ardakov of the University of Oxford and **Michael Wemyss** of the University of Glasgow have been jointly awarded the 2020 Adams Prize in Algebra, this year's chosen field.

The prize citation states: "Professor Ardakov has made substantial contributions to noncommutative Iwasawa theory and to the p -adic representation theory of p -adic Lie groups. In a long-term collaboration with Simon Wadsley, he has developed a p -adic analogue of the classical theory of D -modules, of significance both in representation theory and to the local Langlands program. Professor Wemyss works at the interface of noncommutative algebra with algebraic geometry. He introduced the homological minimal model program and its associated

cluster-mutations and contraction algebras to elucidate and potentially classify birational surgeries of threefolds in terms of noncommutative algebraic data."

Ardakov received his PhD from the University of Cambridge in 2004. He has been a research associate at the University of Sheffield (2006–2007), a Leverhulme Early Career Fellow and lecturer at the University of Nottingham (2007–2011), and Reader in Pure Mathematics at Queen Mary University of London before joining the Mathematical Institute at the University of Oxford in 2013. He received an Early Career Fellowship from the Engineering and Physical Sciences Research Council (EPSRC; 2013–2018) and was an invited speaker at the International Congress of Mathematicians in Seoul in 2014.

Wemyss received his PhD from the University of Bristol in 2008. He has held postdoctoral positions at Nagoya University and the University of Oxford and was lecturer and reader at the University of Edinburgh before joining the faculty at Glasgow. He is currently an EPSRC Early Career Fellow. He was awarded a Whitehead Prize of the London Mathematical Society in 2017.

The Adams Prize is awarded jointly each year by the Faculty of Mathematics and St. John's College to researchers in the United Kingdom under the age of forty doing first-class international research in the mathematical sciences.

—From a University of Cambridge announcement

Bauerschmidt and Gwynne Awarded Davidson Prize

Roland
Bauerschmidt

Roland Bauerschmidt and **Ewain Gwynne** of the University of Cambridge have been named the recipients of the 2020 Rollo Davidson Prize. Bauerschmidt was honored for a series of advances in scaling limits for statistical field theory and random matrices, and Gwynne was recognized for his outstanding work in conformal probability.



Ewain Gwynne

Bauerschmidt received his PhD from the University of British Columbia. He has held postdoctoral positions at Harvard University and the Institute for Advanced Study. His research interests are in probability theory and analysis, in particular in their applications to statistical mechanics, and he is particularly interested in spin systems and phase transitions, self-avoiding walks, random matrices, renormalization, stochastic

dynamics, and supersymmetry in probability theory. He is a coauthor (with D.C. Brydges and G. Slade) of the book *Introduction to a Renormalization Group Method* (Springer, 2019). He tells the *Notices* that he likes animals and enjoys running in his spare time; his favorite writer is Paul Auster.

Gwynne received his PhD from the Massachusetts Institute of Technology in 2018 under the direction of Scott Sheffield. He currently holds a postdoctoral position at Cambridge, supported by a Clay Research Fellowship and a Trinity College Junior Research Fellowship. His work focuses on random geometric objects in two dimensions which arise in theoretical physics, such as Schramm–Loewner evolution (random fractal curves) and Liouville quantum gravity (random fractal surfaces).

The Davidson Prize is awarded annually to early-career probabilists by the Rollo Davidson Trust.

—From a Davidson Trust announcement

Prizes of the Canadian Mathematical Society



Jacopo De Simoi

Jacopo De Simoi of the University of Toronto has been awarded the 2020 Coxeter–James Prize for his work in the area of dynamical systems. The citation reads in part: “Dr. De Simoi works mainly in the field of dynamical systems, but he has very wide interests, spanning from the study of near integrable systems to strongly chaotic ones. He has worked on some of the most prominent outstanding problems in the field, from the study of the standard map to the statistical properties of partially hyperbolic systems.

“Together with C. Liverani, he has published two papers in *Inventiones Mathematicae* which dramatically impact the theory of chaos in slow–fast dynamical systems. Such systems arise naturally in classical problems of Hamiltonian dynamics and should be thought of as having two characteristic time scales; the rough picture of the dynamics can be captured by a suitable averaging of the behavior of the orbits. By understanding the combination of slow–fast dynamics as a small random perturbation of the averaged dynamical system, De Simoi and Liverani proved that it exhibits a strong form of chaos for a new class of dynamical systems which forms an open set in a parameter space.” De Simoi received his PhD in mathematics from the University of Maryland in 2009. He held postdoctoral positions in Paris, Rome, and Toronto before moving to the University of Toronto, where he has been assistant professor since 2016.



Juncheng Wei

Juncheng Wei of the University of British Columbia has been awarded the 2020 Jeffery–Williams Prize for his “exceptional contributions to the theoretical development and interdisciplinary applications of nonlinear partial differential equations.” According to the prize citation, “Dr. Wei’s research is remarkable in its breadth, depth, originality and influence. It is broadly concerned with

developing tools of mathematical analysis and applying them to shed light on phenomena in physics and biology, which are described by mathematical models.”

His important contributions to the geometrization program for elliptic equations “range from counterexample to De Giorgi’s Conjecture in dimensions 9 and higher to nonradial bound states of magnetic Ginzburg–Landau equations, disproving a 1980 conjecture of Jaffe–Taubes. In a surprising paper with C. S. Lin and D. Ye, Dr. Wei gave

a complete classification of a class of Toda systems using purely PDE methods. This led to a wildly original theory of compactness and degree-counting for Toda systems on Riemann surfaces.”

Wei has made “profound contributions to the mathematical theory of pattern formations in mathematical biology, in particular to spike dynamics and stability in reaction–diffusion systems. Nonlocal eigenvalue problems are ubiquitous in analyzing localized patterns in such diverse systems as seashells, urban crime, and voting and group behavior in the social sciences. These unconventional eigenvalue problems are very complex, and little was known about them until one of his groundbreaking papers in 1998 laid the foundation for their rigorous treatment.”

Wei received his PhD in mathematics from the University of Minnesota in 1994. He was a postdoctoral fellow at SISSA in Italy before becoming professor at the Chinese University of Hong Kong, where he worked from 1995 until 2012. Since 2012, he has been Canada Research Chair (Tier I) at the University of British Columbia. He has also been awarded a Simons Fellowship for 2020. He tells the *Notices*: “Outside mathematics, I like walking and enjoy reading Chinese martial arts novels by the famous writer Jin Yong.”



Sujatha Ramdorai

Sujatha Ramdorai of the University of British Columbia has been awarded the 2020 Krieger–Nelson Prize for her exceptional contributions to mathematics research, work that “covers a broad range of subjects, including motives, K -theory, and arithmetic geometry.” The prize citation states, “She is a versatile, creative and technically powerful mathematician” who “first achieved

international recognition for her work in the theory of quadratic forms, real algebraic geometry, and motives.” The citation continues: “In the mid-1990s, Sujatha, in collaboration with John Coates of Cambridge University, moved in an exciting new direction. The starting point was a general result about the Euler characteristics of p -adic Galois representations arising from algebraic varieties over p -adic fields, conjectured earlier by Coates and proved in the case of elliptic curves only, by J.-P. Serre. These results led to a long-ranging line of research responsible for rapid progress in the branch of number theory called Iwasawa theory, culminating in the creation of the new field of non-commutative Iwasawa theory and a precise formulation of the so-called ‘Main Conjecture’ of Iwasawa theory.” Sujatha was awarded the 2006 Ramanujan Prize and was elected a Fellow of the Indian National Academy of Sciences in 2005. She served on the Indian Knowledge Commission, whose mandate was to guide policy and direct reforms in the areas of education, science, technology, agriculture, industry, and governance. In recent years, she has become a bridge between

Canadian and Indian mathematical landscapes and has played an important role in opening up opportunities for junior researchers in both countries. She is also passionate about outreach activities, especially in the area of making quality online math resources available to a broader class of students in the regional languages of India.



Joseph Khoury

Joseph Khoury of the University of Ottawa is the 2020 recipient of the CMS Excellence in Teaching Award. He has been a lecturer at the University of Ottawa for more than twenty years. He received his PhD from the University of Ottawa in 2001 for a thesis focused on types of locally nilpotent derivations, a subject linked to commutative algebra and algebraic geometry. Since 2001, he has been coordinator of the Math Help Center in the Department of Mathematics and Statistics at the University of Ottawa, where he also leads the department's outreach program. His awards and honors include the Part-Time Professor of Year Award, which is the University of Ottawa's most prestigious award for teaching by a lecturer; the Outstanding Contribution to Students' Experience Award; and the 2017 CMS Graham Wright Award for Distinguished Service. He has taught a large variety of courses in both English and French, from first-year introductory mathematics classes to higher level discrete math and differential equations. In all of these, his teaching evaluations have consistently ranked near perfect, and the feedback that he receives from his students speaks to his dedication to teaching and his natural talent for the practice. He has organized and developed several highly successful outreach programs such as Math Horizons Day and the annual CMS Math Camps (the largest of its kind across Canada), as well as several education sessions at various conferences. He has also published a number of scientific articles in refereed journals and is currently writing his third book, *A Tale of Discrete Mathematics*. He and his wife Antoinette have three children. He enjoys, among other things, music, history, and international political affairs.

—From a CMS announcement

Awards of the Association for Women in Mathematics

The Association for Women in Mathematics (AWM) has made its Service Awards for 2020 to the following mathematical scientists.



Raegan Higgins

Raegan Higgins of Texas Tech University was honored for her "extraordinary efforts in promoting women in mathematics" through her participation in organizing committees of the 2017 and 2019 AWM Research Symposia. The citation states: "Professor Higgins's leadership in fostering synergistic connections between the AWM and the local community by identifying organizations and individuals who have made a difference has broadened our reach and furthered our mission of creating a more inclusive community." Higgins responds: "I am so surprised and happy to receive the 2020 AWM Service Award, and I thank AWM for this recognition. I worked to help AWM show its more inclusive side, to show it's not just for mathematicians in academia, government, and industry. It is important to reach and recognize the community that has shaped and continues to shape female mathematicians. I hope what [I] have started continues and I look forward to helping AWM continue the work of empowering, supporting and promoting women in math." Higgins received her PhD from the University of Nebraska in 2008 under the direction of Lynn Erbe and Allan Peterson.



Omayra Ortega

Omayra Ortega of Sonoma State University was honored "for representing AWM while working with the international math community to bring the Maryam Mirzakhani exhibit to the 2019 AWM Research Symposium, including negotiating for the installation and display space, coordination with Rice University, planning for long-term care of the display, and acting as an honorable steward to this collection. Dr. Ortega's commitment served to invite us to see the very personal side of a very public mathematician." Ortega responds: "It has been my great pleasure to serve the Association for Women in Mathematics over the years in many different roles, but bringing the Committee for Women in Mathematics' Remembering Maryam Mirzakhani Exhibit to the 2019 Research Symposium was one of my favorites. These efforts were a labor of love and were more than redeemed as I watched the

reactions of attendees as they took in images of tender moments and insightful thoughts of this pioneering contemporary mathematician whose life was cut short during the peak of her career. Since the Research Symposium, this important exhibit has continued to inspire and be displayed at other locations, including the Institute for Advanced Studies, Pomona College, and the Joint Mathematics Meetings in Denver, Colorado. I am humbled to have been nominated by my peers and selected by the Executive Committee for this 2020 AWM Service Award. Thank you for this honor." Ortega received her PhD from the University of Iowa in 2008.



Denise A. Rangel Tracy

Denise A. Rangel Tracy of Fairleigh Dickinson University was honored "for her deep commitment to the work of the Media Committee and her unflinching efforts to portray AWM positively in the media. Tracy has obtained funding for and led Wikipedia Edit-a-thons at both the Joint Math Meetings and the AWM Research Symposium. She initiated the AWM Playing Cards Project and tracked down and created preliminary lists and data on over a thousand women for that project." Tracy responds: "Thank you for this award. I am happy to be able to better highlight the accomplishments of women in mathematics, both past and present. I appreciate the support AWM has given to start working on the Women in Math Playing Cards and thank you to all the other volunteers now involved in making this project a reality. It'll be a great way to showcase some of the amazing mathematicians who also happen to be women. I especially hope this makes it to the nonmath world. I often feel like the general public doesn't fully understand who we are or what we do as mathematicians (besides teach). Although stereotypes are changing, women are still thought of as a rarity in the mathematical sciences. I think Wikipedia can be a gateway to learning about these women. Our history, our achievements, our struggles, all summarized a few mouse clicks away from each other on a website many people already visit. I hope by working to improve and create new articles on women mathematicians, I am helping people better know them and the work that they do." Tracy received her PhD from the University of Texas at Arlington in 2014.

The winners of the 2020 AWM Student Essay contest, "Biographies of Contemporary Women in Mathematics," are the following. The grand prize, as well as first place in the high school category, was awarded to **Lu Paris** of Head-Royce School, Oakland, California, for "A Lonely Road to Loving Math," about Marissa Kawehi Loving of the Georgia Institute of Technology. This essay will be published in the *AWM Newsletter*. First place in the college category was

awarded to **Ximena Mercado Garcia** of the University of Texas at Austin for her essay "From Mexico to the World: Dr. Villafuerte's Mathematical Adventure," about Laura Villafuerte Altuzar of the University of Texas at Austin. First place in the middle school category was awarded to **Farren Stainton** of Woodstock Union High School and Middle School, Woodstock, Vermont, for "Orange Crocs are the New Pocket Protector," about Heather Vonada of Woodstock Union High School and Middle School. Stainton was also a first-place winner in the 2019 essay competition.

—From AWM announcements

Aggarwal and Li Awarded Clay Research Fellowships



Amol Aggarwal

Amol Aggarwal of Harvard University and **Yang Li** of Imperial College London have been awarded Clay Research Fellowships for 2020 by the Clay Mathematics Institute (CMI).

Amol Aggarwal will receive his PhD in 2020 from Harvard University, where he has been advised by Alexei Borodin. His research lies largely in probability theory and combinatorics, as well as their connections to mathematical physics, integrable systems, and dynamical systems. Aggarwal has already established himself as a powerful mathematician, resolving several long-standing conjectures of broad interest. His achievements to date include his proof of the local statistics conjecture for lozenge tilings, prescribing how local correlations for random tilings of large domains



Yang Li

asymptotically depend on their boundary conditions. He also provided rigorous proofs for predicted phase transitions in the six-vertex model—a fundamental system from statistical mechanics—and for predicted asymptotic distributions in the one-dimensional asymmetric simple exclusion process, an important prototype for interacting particle systems. In a different direction, he proved the conjecture of Eskin and Zorich describing large genus asymptotics of the Masur–Veech volumes and the Siegel–Veech constants of moduli spaces of Abelian differentials. Aggarwal has been appointed a Clay Research Fellow for a term of five years beginning July 1, 2020.

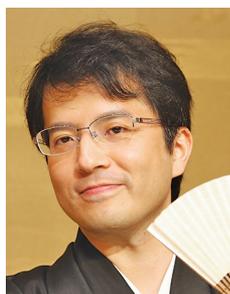
Yang Li received his PhD in 2019 from Imperial College London, under the guidance of Simon Donaldson and

Mark Haskins. He has already made significant contributions to the understanding of Calabi–Yau metrics in complex differential geometry and Riemannian manifolds with exceptional holonomy. In a series of three papers, he studied the behavior of Calabi–Yau metrics on 3-folds with holomorphic fibrations when the fibers have small volume. He discovered a new complete Calabi–Yau metric on \mathbb{C}^3 with singular tangent cone at infinity and showed that this gives a model for the behavior around the critical points of the fibration, resolving an important question in the field. In more recent work, he considers special Lagrangian fibrations of the kind appearing in the Strominger–Yau–Zaslow picture of mirror symmetry and obtained new models for the metric around singular fibers using a powerful combination of techniques from geometry and analysis. Yang’s wider body of work includes many results on Yang–Mills connections and the solution of the Plateau problem for maximal submanifolds. Yang has been appointed a Clay Research Fellow for a term of four years beginning July 1, 2020. He will be based at the Massachusetts Institute of Technology.

Clay Research Fellowships are awarded on the basis of the exceptional quality of candidates’ research and their promise to become mathematical leaders.

—CMI announcement

Prizes of the Mathematical Society of Japan



Yuji Odaka

The Mathematical Society of Japan (MSJ) has awarded several prizes for 2020.

Yuji Odaka of Kyoto University was awarded the Spring Prize “for his outstanding contributions to K -stability and its algebro-geometric applications.” The Spring Prize and the Autumn Prize are the most prestigious prizes awarded by the MSJ to its members. The Spring Prize is awarded to those under the age of

forty who have obtained outstanding mathematical results.

The Algebra Prizes were awarded to **Takuzo Okada** of Saga University for contributions to birational Mori fiber structure of Fano varieties and its application to rationality problems and to **Ryo Takahashi** of Nagoya University for work on subcategories of module categories of commutative rings.

The Outstanding Paper Prizes, given for papers published in the *Journal of the Mathematical Society of Japan*, were awarded to the following: **Katsutoshi Yamanoi**,

Osaka University, for “Pseudo Kobayashi Hyperbolicity of Subvarieties of General Type on Abelian Varieties,” 71 (2019), no. 1; **Masanori Hino**, Kyoto University, and **Shu Kanazawa**, Tohoku University, for “Asymptotic Behavior of Lifetime Sums for Random Simplicial Complex Processes” 71 (2019), no. 3.

—MSJ announcements

Simons Fellows in Mathematics

The Simons Foundation Mathematics and Physical Sciences (MPS) division supports research in mathematics, theoretical physics, and theoretical computer science. The MPS division provides funding for individuals, institutions, and science infrastructure. The Fellows Program provides funds to faculty for up to a semester-long research leave from classroom teaching and administrative obligations. The mathematical scientists who have been awarded 2020 Simons Fellowships are:

- **Benjamin Antieau**, University of Illinois at Chicago
- **Jozsef Balogh**, University of Illinois at Urbana-Champaign
- **Jacob Bedrossian**, University of Maryland, College Park
- **Roman Bezrukavnikov**, Massachusetts Institute of Technology
- **Paul Bourgade**, New York University
- **Martin Bridgeman**, Boston College
- **Richard Canary**, University of Michigan
- **Jonathan Chaika**, University of Utah
- **Xiaohui Chen**, University of Illinois at Urbana-Champaign
- **Artem Chernikov**, University of California, Los Angeles
- **David Damanik**, Rice University
- **Mark Andrea de Cataldo**, Stony Brook University
- **Adrian Diaconu**, University of Minnesota–Twin Cities
- **Nathan Dunfield**, University of Illinois at Urbana-Champaign
- **David Fisher**, Indiana University
- **Mohammad Ghomi**, Georgia Institute of Technology
- **Michael Harris**, Columbia University
- **Svetlana Jitomirskaya**, University of California, Irvine
- **Tasho Kaletha**, University of Michigan
- **Boris Khesin**, University of Toronto
- **Marcus Khuri**, Stony Brook University
- **Alexander Kiselev**, Duke University
- **Leonid Korolov**, University of Maryland, College Park
- **Michael Lacey**, Georgia Institute of Technology
- **Yanyan Li**, Rutgers, The State University of New Jersey
- **Victor Lie**, Purdue University
- **Mauro Maggioni**, Johns Hopkins University

- Elizabeth Meckes, Case Western Reserve University
- Hee Oh, Yale University
- Richard Schwartz, Brown University
- Karl Schwede, University of Utah
- Konstantinos Spiliopoulos, Boston University
- Bianca Viray, University of Washington
- Z. Jane Wang, Cornell University
- Rachel Ward, University of Texas at Austin
- Juncheng Wei, University of British Columbia
- Elisabeth Werner, Case Western Reserve University
- Ting Zhou, Northeastern University
- Xinwen Zhu, California Institute of Technology
- Aleksey Zinger, Stony Brook University

—From a Simons Foundation announcement

Yu Awarded Parzen Prize



Bin Yu

Bin Yu of the University of California, Berkeley, has been awarded the 2018 Emanuel and Carol Parzen Prize for Statistical Innovation for her “innovative, influential, and outstanding research in algorithm and theory of statistical machine learning and causal inference.” Building on computational advances and increased data availability, data science has emerged as a platform that integrates statistics, computer science, and other disciplines.

Yu trained in statistics but was driven to leverage new computational developments, including machine learning, to solve important scientific problems. She seeks to formalize the principles of data science while making it more accessible to researchers from other fields. She has laid out a framework called PCS, which stands for the three principles of data science—predictability, computability, and stability—to guide those who solve domain data problems with data science tools. Her interdisciplinary research involves genomics, neuroscience, remote sensing, and precision medicine. She and her team have been working to develop models to connect hospitals with needed supplies during the coronavirus pandemic. Yu received her PhD in statistics from the University of California, Berkeley, in 1990. She held a Guggenheim Foundation Fellowship in 2006 and was awarded the Elizabeth L. Scott Award from the Committee of Presidents of Statistical Societies in 2018. She is a fellow of the American Statistical Association, the Institute of Mathematical Statistics, the Institute of Electrical and Electronics Engineers, the American Association for the Advancement of Science, the American Academy of Arts and Sciences, and the National Academy of Sciences.

The Parzen Prize is awarded in even-numbered years to a North American statistician whose outstanding research contributions include innovations that have had an impact on practice and who received his or her PhD degree twenty-five years or more before the date of the prize.

—From a Parzen Prize announcement

Panzer Receives Weyl Prize



Erik Panzer

Erik Panzer of the University of Oxford has been awarded the 2020 Hermann Weyl Prize of the International Colloquium on Group Theoretical Methods in Physics for “his pioneering achievements in the calculation of amplitudes in gauge theories, for developing new mathematical structures that exploit the language of symmetries, and for his contribution to the description of important

physical phenomena present in nature.” Panzer received his PhD in 2015 from Humboldt Universität zu Berlin under the direction of Dirk Kreimer. His research interests include Feynman integrals, hyperlogarithms, (elliptic) polylogarithms, (elliptic) multiple zeta values, motivic periods, combinatorial Hopf algebras, renormalization, and Dyson–Schwinger equations. He enjoys running and listening to jazz music and playing the piano. He tells the *Notices*: “I am from a region (Spreevald [Brandenburg, Germany]) that is famous for pickled cucumbers.” The Weyl Prize recognizes young scientists who have performed top-level original work in the area of understanding physics through symmetries.

—From a Weyl Prize announcement

Wang and Xu Receive 2020 IBC Award

Heping Wang of Capital Normal University, Beijing, and **Guiqiao Xu** of Tianjin Normal University have been chosen as the recipients of the 2020 Joseph F. Traub Prize for Achievement in Information-Based Complexity. They will share the cash award of US\$3,000. The members of the prize committee were Jan Vybíral, Paweł Przybyłowicz, Thomas Kühn, Winfried Sickel, Henryk Woźniakowski and Erich Novak.

—Erich Novak
Friedrich-Schiller-Universität Jena

ANZIAM Prizes Awarded

Australian and New Zealand Industrial and Applied Mathematics (ANZIAM), a division of the Australian Mathematical Society, has awarded medals for 2020 to three mathematical scientists.

Lawrence Forbes of the University of Tasmania was awarded the ANZIAM Medal for his “outstanding contribution over many years to applied and industrial mathematics with special contributions to the theory and numerical computation of fluid flows and the design of magnetic resonance imaging (MRI) coils.” **Matthew Simpson** of Queensland University of Technology received the E. O. Tuck Medal for his work, which “involves the development and application of mathematical tools for describing collective migration of populations of adhesive biological cells and the development and use of mathematical models to study a range of biomedical phenomena.” **Jennifer Flegg** of the University of Melbourne was honored with the J. H. Michell Medal for her “outstanding record of research excellence in mathematical modeling over a broad range of applications,” particularly her contributions to the spread of antimalarial drug resistance and tissue repair.

—From an ANZIAM announcement

Putnam Prizes Awarded

The winners of the eightieth William Lowell Putnam Mathematical Competition have been announced. The Putnam Competition is administered by the Mathematical Association of America (MAA) and consists of an examination containing mathematical problems that are designed to test both originality and technical competence. Prizes are awarded both to individuals and to teams.

The six highest ranking individuals each received a cash award of US\$2,500. Listed in alphabetical order, they are:

- Ashwin Sah, Massachusetts Institute of Technology
- Kevin Sun, Massachusetts Institute of Technology
- Yuan Yao, Massachusetts Institute of Technology
- Shengtong Zhang, Massachusetts Institute of Technology
- Daniel Zhu, Massachusetts Institute of Technology

Institutions with at least three registered participants obtain a team ranking in the competition based on the rankings of three designated individual participants. The five top-ranked teams (with members listed in alphabetical order) were:

- Massachusetts Institute of Technology: **Ashwin Sah, Shengtong Zhang, Daniel Zhu**
- Harvard University: **Sehun Kim, Sheldon Kieren Tan, Franklyn Wang**
- Stanford University: **David Kwei Lin, John Mistele, Hanzhi Zheng, Yifan Zhu**

- University of California, Los Angeles: **Ciprian Bonciocat, Jacob Zhang, Kaiqi Zhu**
- University of Waterloo: **Gian Cordana Sanjaya, Kai Sun, Anzo Zhao Yang Teh**

The first-place team receives an award of \$25,000, and each member of the team receives \$1,000. The awards for second place are \$20,000 and \$800, respectively; for third place, \$15,000 and \$600; for fourth place, \$10,000 and \$400; for fifth place, \$5,000 and \$200. Where four names are mentioned, there was a tie for third place at that institution.

Laura Pierson, Harvard University; **Qi Qi**, Massachusetts Institute of Technology; and **Hanzhi Zheng**, Stanford University, were awarded Elizabeth Lowell Putnam Prizes for outstanding performance by a woman in the competition. Each receives an award of US\$1,000.

—From an MAA announcement

2020 SIAM Fellows Elected

The Society for Industrial and Applied Mathematics (SIAM) has elected its class of fellows for 2020. Their names and institutions follow.

- **Srinivas Aluru**, Georgia Institute of Technology
- **Steven Ashby**, Pacific Northwest National Laboratory
- **John P. Boyd**, University of Michigan
- **Richard Byrd**, University of Colorado, Boulder
- **Ümit V. Çatalyürek**, Georgia Institute of Technology
- **David Colton**, University of Delaware
- **Jorge Cortes**, University of California, San Diego
- **George Cybenko**, Dartmouth College
- **Alicia Dickenstein**, Universidad de Buenos Aires and CONICET
- **Yalchin Efendiev**, Texas A&M University
- **Martin J. Gander**, University of Geneva
- **David M. Gay**, AMPL Optimization, Inc.
- **Laura Grigori**, Inria
- **George Haller**, ETH Zürich
- **Alfred Hero**, University of Michigan
- **Kristin E. Lauter**, Microsoft Research
- **Knut-Andreas Lie**, SINTEF
- **Robert Lipton**, Louisiana State University
- **Yi Ma**, University of California, Berkeley
- **Kavita Ramanan**, Brown University
- **Olaf Schenk**, Università della Svizzera Italiana
- **Jie Shen**, Purdue University
- **Ronnie Sircar**, Princeton University
- **Aravind Srinivasan**, University of Maryland, College Park
- **Defeng Sun**, Hong Kong Polytechnic University
- **Ruth J. Williams**, University of California San Diego

- **Barbara Wohlmuth**, Technische Universität München
- **Pingwen Zhang**, Peking University

—From a SIAM announcement

NSF Graduate Fellowships

The National Science Foundation (NSF) has awarded a number of Graduate Research Fellowships for fiscal year 2020. Further awards may be announced later in the year. This program supports students pursuing doctoral study in all areas of science and engineering and provides a stipend of US\$30,000 per year for a maximum of three years of full-time graduate study. Information about the solicitation for the 2021 competition will be published in the “Mathematics Opportunities” section of an upcoming issue of the *Notices*.

Following are the names of the awardees in the mathematical sciences selected so far in 2020, followed by their undergraduate institutions (in parentheses) and the institutions at which they plan to pursue graduate work.

- **Niven Achenjang** (Stanford University), Stanford University
- **Ashleigh Adams** (University of Minnesota–Twin Cities), University of Minnesota–Twin Cities
- **Yulia Alexandr** (Wesleyan University), University of California, Berkeley
- **Savana J. Ammons** (Harvey Mudd College), Harvey Mudd College
- **Stacy A. Ashlyn** (West Chester University of Pennsylvania), Florida State University
- **Marissa Ashner** (Illinois Institute of Technology), University of North Carolina at Chapel Hill
- **Jacksyn Bakeberg** (McGill University), McGill University
- **Mohit Bansil** (Michigan State University), Michigan State University
- **Nicholas A. Bartelo** (State University of New York at Buffalo), State University of New York at Buffalo
- **Jesica A. Bauer** (Carroll College), Rensselaer Polytechnic Institute
- **Alex J. Boyd** (California Polytechnic State University), University of California, Irvine
- **Anuraag Bukkuri** (University of Minnesota–Twin Cities), University of Minnesota–Twin Cities
- **Tianhui Cai** (Harvard College)
- **Maxine E. Calle** (Reed College), Reed College
- **Kapil Chandran** (Princeton University), Princeton University
- **Jonathan Che** (Amherst College), Harvard University
- **Joyce A. Chew** (Calvin College), Calvin College
- **Anthony A. Coniglio** (Indiana University), Cambridge University
- **Ellen M. Considine** (University of Colorado at Boulder), University of Colorado at Boulder
- **Mayleen E. Cortez** (California State University, Channel Islands), California State University, Channel Islands
- **Samantha Dean** (University of Chicago)
- **Paheli Desai-Chowdhry** (University of California, San Diego), University of California, Los Angeles
- **Ethan N. Epperly** (University of California, Santa Barbara) University of California, Santa Barbara
- **Theodore Y. Faust** (Michigan State University), Michigan State University
- **Patrick T. Flynn** (Oregon State University), Brown University
- **Bryce A. Frederickson** (Utah State University), Utah State University
- **Kevin B. Fry** (Stanford University), Stanford University
- **Marisa Gaetz** (Massachusetts Institute of Technology), Massachusetts Institute of Technology
- **Micah C. Gay** (Columbia University), Columbia University
- **Miriam Gordin** (Brown University), Brown University
- **Olivia Greathouse** (Winthrop University), Winthrop University
- **Daniel Gurevich** (Georgia Institute of Technology), Georgia Institute of Technology
- **Derenik Haghverdian** (University of California, Los Angeles), University of California, Irvine
- **Laurel Rainier Hamm Heck** (Oberlin College), Oberlin College
- **Erik E. Herrera** (California Institute of Technology), California Institute of Technology
- **Addison Hu** (Yale University), Carnegie-Mellon University
- **Joseph Jackson** (Swarthmore College), University of Texas at Austin
- **Caleb Ji** (Washington University), Higher School of Economics
- **Siddarth P. Kannan** (Pomona College), Brown University
- **Kabir S. Kapoor** (Cornell University), Cornell University
- **Joshua L. Kazdan** (Stanford University), Stanford University
- **Colby Kelln** (University of Michigan, Ann Arbor), University of Michigan, Ann Arbor
- **Katherine C. Kempfert** (University of Florida), University of California, Berkeley
- **Brian King** (Baylor University), Rice University
- **Forest D. Kobayashi** (Harvey Mudd College), Harvey Mudd College
- **Casimir M. Kothari** (Princeton University), Princeton University
- **Noah Kravitz** (Yale University), Yale University
- **Russell Kunes** (Harvard University), Columbia University

- **Michael Kural** (Massachusetts Institute of Technology), Massachusetts Institute of Technology
- **Jackson P. Lautier** (University of Connecticut), University of Connecticut
- **Sheraline T. Lawles** (University of New Mexico), University of New Mexico
- **Hannah Lawrence** (Yale University), Yale University
- **Catherine Lee** (Yale University), Yale University
- **Matthew Lerner-Brecher** (Columbia University), Columbia University
- **Matthew E. Levine** (Columbia University), California Institute of Technology
- **Biyonka Liang** (University of California, Berkeley)
- **Alice D. Lin** (Princeton University), Princeton University
- **Nicholas B. Link** (Rice University)
- **Mark F. Macerato** (University of Pennsylvania), University of California, Berkeley
- **Wyatt Mackey** (Harvard College), Stanford University
- **Daniel P. Maes** (Williams College), University of Michigan, Ann Arbor
- **Nicole F. Magill** (Quest University Canada), Cornell University
- **Aimee E. Maurais** (Virginia Polytechnic Institute and State University)
- **Vaughan McDonald** (Harvard College), Harvard College
- **Trini Nguyen** (California State University, Fullerton), University of California, Irvine
- **Evangelos A. Nikitopoulos** (Brown University), University of California, San Diego
- **Alexander D. Nolte** (Tufts University), Rice University
- **William J. Ogden** (University of Minnesota–Twin Cities), University of Minnesota–Twin Cities
- **Otto V. Osterman** (University of Texas at Dallas), University of Texas at Dallas
- **Natalia M. Pacheco-Tallaj** (Harvard University), Harvard University
- **Biraj Pandey** (University of Texas at Austin), University of Washington
- **David J. Passey** (Brigham Young University), Brigham Young University
- **Maia Powell** (University of Northern Colorado), University of California, Merced
- **Oron Y. Propp** (Massachusetts Institute of Technology), Massachusetts Institute of Technology
- **Leah Reeder** (Colorado School of Mines), Colorado School of Mines
- **Wyatt Reeves** (University of Texas at Austin), University of Texas at Austin
- **Zhi Ren** (California Institute of Technology), Massachusetts Institute of Technology
- **Jeremy Rubin** (University of Maryland, Baltimore County), University of Maryland, Baltimore County
- **Ashwin Sah** (Massachusetts Institute of Technology), Massachusetts Institute of Technology
- **Maya R. Sankar** (Massachusetts Institute of Technology), Massachusetts Institute of Technology
- **Mariya A. Savinov** (University of Pittsburgh), University of Pittsburgh
- **Mehtaab Sawhney** (Massachusetts Institute of Technology), Massachusetts Institute of Technology
- **Laura Seaberg** (Haverford College), Haverford College
- **Jorge S. Guzman** (University of California, Irvine), University of California, Irvine
- **Suzanna Stephenson** (Brigham Young University), Brigham Young University
- **Zachary J. Stier** (Princeton University), Princeton University
- **Douglas J. Stryker** (Massachusetts Institute of Technology), Massachusetts Institute of Technology
- **Becky Tang** (Swarthmore College), Duke University
- **Alec K. Traaseth** (University of Virginia), University of Virginia
- **Kevin M. Tully** (Wheaton College), Wheaton College
- **Claire N. Valva** (University of Chicago), University of Chicago
- **Collin Victor** (University of Nebraska–Lincoln), University of Nebraska–Lincoln
- **Allison Y. Wang** (California Institute of Technology), California Institute of Technology
- **Jamelle Watson-Daniels** (Brown University), Harvard University
- **Natalie Wellen** (Worcester Polytechnic Institute), University of Washington
- **Charles J. Wolock** (Harvard University), University of Washington
- **Katharine Woo** (Stanford University), Stanford University
- **Catherine S. Xue** (Yale University), Harvard University
- **Fiona Young** (Harvard College), Cornell University
- **Teresa Yu** (Williams College), Williams College
- **Julie Y. Zhang** (University of Washington), University of Washington
- **Yunkun Zhou** (Massachusetts Institute of Technology), Stanford University
- **Emily Zhu** (Carnegie-Mellon University), University of California, San Diego

—NSF announcement

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