

Mathematics People

Austin Awarded Ostrowski Prize



Tim Austin

Tim Austin of the University of California, Los Angeles, has been awarded the 2021 Ostrowski Prize “for his outstanding work in a remarkably broad array of fields, including probability theory, ergodic theory and dynamics, combinatorics, operator algebras, group cohomology, and metric geometry. He made several breakthroughs, solving old

standing problems, while at the same time making deep theory-building contributions.” The citation emphasizes his “recent groundbreaking solution of the weak Pinsker conjecture in ergodic theory. Ever since the 1970s, when this conjecture was formulated by Thouvenot, it has been recognized as the most important open problem in Bernoulli isomorphism theory. Austin’s result, solving the problem in the affirmative, states that an arbitrary measure-preserving transformation decomposes as a direct product of a Bernoulli shift and a low-entropy transformation. This is the first general structure theorem in entropy theory, a spectacular result which is broadly regarded as the most important development in this subject in the last forty years. While this is a remarkable achievement in dynamics, the main tool is an equally formidable achievement from the point of view of analysis. In order to prove it, Austin established a remarkable concentration of measure result—a new way to decompose measures on high-dimensional products into a controlled number of parts that exhibit concentration of measure.”

Austin was born in London and received his PhD in 2010 from the University of California, Los Angeles, under the direction of Terence Tao. He was a Clay Research Fellow from 2010 through 2014, a visiting academic at Brown University (2010–2012), and assistant and associate professor at the Courant Institute of Mathematical Sciences from 2012 through 2017. He joined the faculty at UCLA in 2017, where is currently a full professor. In 2020 he was awarded a New Horizons in Mathematics Prize. He

has given a large number of talks, including the Bernoulli Lecture in Lausanne in 2019.

The Ostrowski Prize is awarded every other year by the Ostrowski Foundation and has a current cash value of 100,000 Swiss francs (approximately US\$107,000).

—From an Ostrowski Foundation announcement

Pila Awarded Schock Prize



Jonathan S. Pila

Jonathan S. Pila of the University of Oxford has been awarded the 2022 Rolf Schock Prize in Mathematics “for his groundbreaking work on André–Oort’s conjecture.” According to the prize citation, Pila “is mainly active in Diophantine geometry, which is a branch of number theory that studies Diophantine equations using algebraic geometry. Pila has decisively enriched this field by intro-

ducing methods based on model theory in mathematical logic. Using these methods, together with Zannier, he provided a completely new proof of the Manin–Mumford conjecture. He has subsequently, partly in collaboration with Tsimerman, made important contributions to the even more demanding André–Oort conjecture.” Pila received his PhD from Stanford University in 1988 under the supervision of Peter Sarnak. He has held positions at Columbia University, McGill University, and the University of Bristol and was visiting scholar at the Institute for Advanced Study. His honors include a Clay Research Award (2011) and a Senior Whitehead Prize from the London Mathematical Society (2011). He received a Leverhulme Trust Research Fellowship (2008–2010) and the Karp Prize of the Association for Symbolic Logic (2013). He was elected a Fellow of the Royal Society in 2015. The Schock Prize carries a cash award of 500,000 Swedish krona (approximately US\$53,000).

—From a Royal Swedish Academy of Sciences announcement

Thorne Awarded Adams Prize



Jack Thorne

Jack Thorne of the University of Cambridge has been awarded the 2021–2022 John Couch Adams Prize, given this year in the area of number theory. The prize citation says: “Jack Thorne is awarded the 2022 Adams Prize for his deep and innovative contributions to the Langlands programme. Among his achievements are the construction (with Harris, Lan, and Taylor) of Galois representations attached to automorphic forms

over CM fields, and his work on automorphy of symmetric power L -functions, culminating in his spectacular proof (with James Newton) of the modularity conjecture for all symmetric powers of classical cusp forms.” Thorne received his PhD from Harvard University in 2012 under the direction of Benedict Gross and Richard Taylor. He was a Junior Fellow of the Society of Fellows of Harvard in 2012–2014. He joined the University of Cambridge as a reader in number theory in 2013 and became a professor of number theory in 2018. He was elected a Fellow of Trinity College at Cambridge in 2021. Thorne’s awards and honors include a Clay Research Fellowship (2012–2017), the Whitehead Prize of the London Mathematical Society (2017), the SASTRA Ramanujan Prize (2018, with Yifeng Liu), the EMS Prize of the European Mathematical Society (2020), and the New Horizons in Mathematics Prize (2021). He was an invited speaker at the International Congress of Mathematicians in Rio de Janeiro, Brazil, in 2018. He was elected a Fellow of the Royal Society in 2020.

The prize is awarded jointly each year by the Faculty of Mathematics and St. John’s College to United Kingdom-based researchers under the age of forty doing first-class international research in the mathematical sciences. It carries a cash award of £25,000 (approximately US\$33,000).

—*Elaine Kehoe, from a University of Cambridge announcement*

Dongarra Receives Turing Award

Jack Dongarra of the University of Tennessee and Oak Ridge National Laboratory has been named the recipient of the 2022 Turing Award of the Association for Computing Machinery (ACM) “for his work on fundamental concepts and code that allowed computer software to keep pace with the hardware inside the world’s most powerful machines.” Dongarra was



Jack Dongarra

part of a team of researchers who developed the computer code Linpack (linear algebra package) which “offered a way to run complex mathematics on what we now call supercomputers.” He developed algorithms that could increase the power and efficiency of supercomputers.

Dongarra received his PhD in applied mathematics from the University of New Mexico in 1980. He held positions at Argonne National Laboratory, rising to senior scientist. He is currently a Turing Fellow at the University of Manchester. In 2010 he was the first recipient of the Society for Industrial and Applied Mathematics (SIAM) Activity Group on Supercomputing Career Prize. He has also received the Charles Babbage Award of the Institute of Electrical and Electronics Engineers (IEEE) Computer Society (2011), the ACM/IEEE Ken Kennedy Award (2013), the SIAM/ACM Prize in Computational Science (2019), and the IEEE Computer Pioneer Award (2020). He is a Fellow of the American Association for the Advancement of Science (AAAS), SIAM, ACM, and IEEE. He is a foreign member of the Russian Academy of Sciences and of the Royal Society. He is an elected member of the National Academy of Engineering. The Turing Award carries a prize of US\$1 million.

—*From an ACM announcement*

Greenbaum Named Kovalevsky Lecturer



Anne Greenbaum

Anne Greenbaum of the University of Washington has been awarded the Sonia Kovalevsky Lectureship for 2022 by the Association for Women in Mathematics (AWM) and the Society for Industrial and Applied Mathematics (SIAM). She will deliver the prize lecture, “Two of My Favorite Problems,” at the SIAM Annual Meeting in July 2022.

The prize citation reads: “Anne Greenbaum has had a long-lasting and significant impact on many aspects of numerical linear algebra. She is an expert in the mathematical behavior of iterative methods and has solved many fundamental problems in convergence theory for linear systems and eigenvalue problems, non-normal matrices and functions of matrices. Greenbaum is the author of highly respected books on the subject, including *Methods for Solving Linear Systems*, published by SIAM, and, with Tim Chartier, *Numerical Methods:*

Design, Analysis, and Computer Implementation of Algorithms, published by Princeton University Press. She was also one of the original developers of the LAPACK software that has been a workhorse of scientific computing for several decades. Greenbaum is a dedicated and effective teacher and mentor.”

After receiving her bachelor’s degree in mathematics from the University of Michigan in 1974, Greenbaum worked at the Lawrence Livermore Laboratory. She began doctoral studies and earned her PhD from the University of California, Berkeley, in 1981. She held a research position at the Courant Institute of Mathematical Sciences from 1986 to 1997, when she joined the faculty at the University of Washington, where she is currently professor of applied mathematics. She was elected a Fellow of SIAM in 2015. Other honors include the 1997 B. Bolzano Honorary Medal for Merit in the Mathematical Sciences from the Academy of Sciences of the Czech Republic and the SIAG Linear Algebra award, joint with Zdeněk Strakoš, for Outstanding Paper in Applicable Linear Algebra during 1991–1993.

The Kovalevsky Lectureship was established by AWM and SIAM to honor significant contributions by women to applied or computational mathematics.

—From an AWM announcement

Weekes Named Falconer Lecturer



Suzanne L. Weekes

Suzanne L. Weekes, executive director of the Society for Industrial and Applied Mathematics (SIAM), has been honored with the 2022 Etta Z. Falconer Lectureship of the Association for Women in Mathematics (AWM) and SIAM. She will deliver the prize lecture at the Summer MathFest of the Mathematical Association of America (MAA) in August 2022.

The citation reads: “Dr. Weekes is a highly regarded mathematician with a deep commitment to mathematical and statistical research and to outreach. She has won numerous awards, including the MAA Deborah and Franklin Tepper Haimo Award for Teaching in 2020 and the AWM M. Gweneth Humphreys Award for Mentoring in 2019. In 2006, Dr. Weekes cofounded MSRI-UP [the Mathematical Sciences Research Institute Undergraduate Program], a program designed to increase the representation of historically underrepresented groups in the mathematical profession. Through 2020, she served as codirector of MSRI-UP, which recently won the American Mathematical Society’s

Programs that Make a Difference Award. Since 2013, she has been a founding codirector of the MAA/SIAM Preparation for Industrial Careers in Mathematical Sciences (PIC Math) program. Funded by the National Science Foundation (NSF), PIC Math increases awareness among mathematical sciences faculty and undergraduates about nonacademic career options and prepares those students for industrial careers by engaging them in research problems that come directly from industry.”

Weekes was born and raised in Trinidad. She received her PhD from the University of Michigan in 1995 and did postdoctoral work at Texas A&M University. She is professor of mathematical sciences at Worcester Polytechnic Institute (WPI). At WPI, she served as Associate Head of Mathematical Sciences from 2006 through 2012, director and associate director of the Center for Industrial Mathematics and Statistics from 2003–2014, and interim associate dean of undergraduate studies from 2019–2020. Her research work has been in numerical methods for differential equations, including applications to spatiotemporal composites, cancer growth, and porous media flow. She has been involved in various initiatives connecting the academic mathematics community to mathematics and statistics work done in business, industry, and government.

—From an AWM announcement

Shapiro Awarded 2021 von Neumann Prize



Alexander Shapiro

Alexander Shapiro of the Georgia Institute of Technology has received the 2021 INFORMS John von Neumann Theory Prize “for his foundational contributions to theory and computational methods for stochastic programming, as well as seminal contributions to nonlinear analysis.” The prize citation reads: “Dr. Shapiro has had a formative impact on stochastic programming, with

many influential papers on the topic and two excellent and highly cited books on the subject (one joint with A. Ruszczyński, *Stochastic Programming*, Elsevier, 2003; and the other joint with D. Dentcheva and A. Ruszczyński, *Lectures on Stochastic Programming*, SIAM, 2009, 2014). Of particular note is his pioneering contribution to the complexity analysis of stochastic programming, which builds upon his development (since the 1980s) of a large and very influential body of work related to the asymptotic analysis and statistical inference of sample average approximations (SAA) of stochastic programs. His paper ‘Simulation-based

optimization: Convergence analysis and statistical inference,' published in *Stochastic Models* in 1996, investigates, for the first time in the then forty-year-old history of the subject, theoretical computational complexity of various generic stochastic programming problems. His recent work focuses on risk-averse decision making and includes development of a new modeling methodology for multistage risk-averse decision making, reducing the problem to a 'nested' series of similar problems with smaller time horizons (and thus much more 'computationally friendly' than the original multistage formulation of the problem). The techniques for multistage risk-averse decision making developed by Dr. Shapiro form the core methodology underlying Brazil's long-term planning of electric power generation. Dr. Shapiro is also well known for his contributions to sensitivity analysis and optimality conditions in continuous optimization, having developed important results for conic, nonsmooth and semi-infinite problems, problems involving matrix-valued functions and functions of eigenvalues of symmetric matrices, variational inequalities, and problems with equilibrium constraints."

Shapiro was born in Moscow, Russia, and received his PhD in 1981 from Ben-Gurion University of the Negev. In 2013 he was awarded the Khachiyan Prize for Lifetime Achievements in Optimization from INFORMS, and in 2018 he was a recipient of the Dantzig Prize awarded by the Mathematical Optimization Society and the Society for Industrial and Applied Mathematics (SIAM). He has been editor-in-chief of the journal *Mathematical Programming, Series A*, and was an area editor of the journal *Operations Research*. He was elected to the National Academy of Engineering in 2020.

—From an INFORMS announcement

Prizes of the CMS

The Canadian Mathematical Society (CMS) has awarded several prizes for 2022.



Fabio Pusateri

Fabio Pusateri of the University of Toronto has been awarded the 2022 Coxeter–James Prize "for his seminal work in analysis and partial differential equations." According to the prize citation, his "ideas and methods have direct applications to a large class of physical settings such as fluid dynamics, quantum mechanics, plasma turbulence and general relativity. He has carried out groundbreaking research on global existence and regularity of solutions of equations that describe water waves, for the first time incorporating physical effects such as gravity and surface

tension. He also has important results on a variety of other problems, including the stability of spatially periodic waves, and the long-time asymptotics of special solutions, such as solitary waves and kinks, for various canonical evolution PDEs." Pusateri received his PhD from the Courant Institute of Mathematical Sciences of New York University in 2011. He was a Simons Postdoctoral Fellow and instructor at Princeton University from 2011 to 2014, then served as assistant professor at Princeton from 2014 to 2018. He joined the University of Toronto in 2018. He received the ISAAC Award from the International Society for Analysis, Its Applications, and Computation in 2019 and the Antonio Ambrosetti Medal (with Po-Lam Yung) in 2021. He is a member of the editorial board of *Nonlinear Analysis*. The Coxeter–James Prize recognizes young mathematicians who have made outstanding contributions to mathematical research.



Matilde Lalín

Matilde Lalín of the University of Montreal has been awarded the 2022 Krieger–Nelson Prize "for her outstanding contributions to research in number theory and related areas." According to the prize citation, her work "focuses on L -functions. She has been studying relations between special values of L -functions and Mahler measure, a height that can be defined on polynomials, and contributing to the understanding of very general statements such as the Beilinson conjectures. She is known for her use of innovative techniques that allow proof of identities between multivariable Mahler measures using regulators and higher Bloch groups. Matilde is also interested in distribution questions around families of L -functions and their behavior at central points. It is worth noting that she was involved (with David and Florea) in the proof of a positive proportion of nonvanishing for cubic L -functions." Lalín received her PhD from the University of Texas at Austin in 2005. She has been a member of the Institute for Advanced Study (2005–2006), a Clay Liffort Fellow (2005), a postdoctoral fellow at the Pacific Institute of Mathematical Sciences (PIMS) and the University of British Columbia (2006–2007), and an assistant professor at the University of Alberta (2007–2010). She is currently professor at Montreal and a member of the Centre de Recherches Mathématiques (CRM). She has held visiting positions at the Mathematical Sciences Research Institute, the Institut des Hautes Études Scientifiques (IHES), and the Max Planck Institute for Mathematics. She is associate editor of the *Canadian Journal of Mathematics* and the *Canadian Mathematical Bulletin*. She is a member of the Board of Directors of the Banff International Research Station for Mathematical Innovation and Discovery (BIRS) and vice president, Quebec, of the CMS. She tells the *Notices*: "I grew up in Argentina, and I love Argentinian food. My husband

is also Argentinean, and we speak Spanish with our two children. Since we live in Montreal, a French–English city, our kids are trilingual!”



André Joyal

André Joyal of the University of Quebec at Montreal has been named the 2022 recipient of the Jeffery–Williams Prize for his contributions to mathematical research. According to the prize citation, he “is known initially for his work on geometric logic, which he introduced with Gonzalo Reyes. His theory of species of structures was the first application of category theory to combinatorics.

He made many important contributions to category theory in collaboration with Myles Tierney, Ross Street, and Ieke Moerdijk. He gave a new construction of free lattices from game theory. He introduced the notion of delta-ring in the theory of Witt vectors and, with Terence Bisson, the notion of Q-ring in the theory of Dyer–Lashof operations. He contributed to the development of higher category theory by showing that category theory can be fully extended to quascategories. He is presently working in higher topos theory with a group of collaborators.” He has held visiting positions at Columbia University (1982–1984), the Fields Institute (2007), CRM Barcelona (2008), and the University of Paris (2011). He was a member of the Institute for Advanced Study (2013) and of the Institut des Hautes Études Scientifique (IHES; 2014), as well as of the Center for Advanced Study in Oslo. He is a member of the Royal Society of Canada.

—From CMS announcements

2022 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 names and institutions of the mathematical scientists who have been awarded 2022 Simons Fellowships follow.

- **David F. Anderson**, University of Wisconsin-Madison
- **Jason Behrstock**, Lehman College, City University of New York
- **Jin-Yi Cai**, University of Wisconsin-Madison
- **Xuwen Chen**, University of Rochester
- **Vaughn Climenhaga**, University of Houston

- **Henri Darmon**, McGill University
- **Giovanni Forni**, University of Maryland, College Park
- **Ailana Fraser**, University of British Columbia
- **Alexander Goncharov**, Yale University
- **Matthew Gursky**, University of Notre Dame
- **Piotr Hajłasz**, University of Pittsburgh
- **Jennifer Hom**, Georgia Institute of Technology
- **Adrian Ioana**, University of California, San Diego
- **Nataša Jonoska**, University of South Florida
- **Jeff Kahn**, Rutgers, The State University of New Jersey
- **Jeremy Kahn**, Brown University
- **Chanwoo Kim**, University of Wisconsin-Madison
- **Dmitry Kleinbock**, Brandeis University
- **Alexander Kleshchev**, University of Oregon
- **Sándor Kovács**, University of Washington
- **Michael Larsen**, Indiana University
- **H. Blaine Lawson**, Stony Brook University
- **Melvin Leok**, University of California, San Diego
- **Tao Li**, Boston College
- **Ayelet Lindenstrauss**, Indiana University
- **Robert Lipshitz**, University of Oregon
- **Robert J. McCann**, University of Toronto
- **Emily Riehl**, Johns Hopkins University
- **Mark Rudelson**, University of Michigan
- **Rayan Saab**, University of California, San Diego
- **Laurent Saloff-Coste**, Cornell University
- **Michael Stillman**, Cornell University
- **Vesna Stojanoska**, University of Illinois at Urbana-Champaign
- **Jeffrey D. Streets**, University of California, Irvine
- **Pham Huu Tiep**, Rutgers, The State University of New Jersey
- **Alex Townsend**, Cornell University
- **Mariusz Urbański**, University of North Texas
- **Alexander Zupan**, University of Nebraska-Lincoln

—From a Simons Foundation announcement

Bhargava, Williams, and Lim Awarded Guggenheim Fellowships

The John Simon Guggenheim Foundation has awarded its Fellowships for 2022. **Manjul Bhargava** of Princeton University and **Lauren K. Williams** of Harvard University received Fellowships in Mathematics. **Lek-Heng Lim** of the University of Chicago was awarded a Fellowship in Applied Mathematics. Bhargava has made fundamental contributions to number theory. He received his PhD from Princeton University under the direction of Andrew Wiles. He was awarded the Fields Medal in 2014. His other honors include the Morgan Prize (1996), the SASTRA

Ramanujan Prize (2005; with K. Soundararajan), a Clay Research Award (2005), the AMS Cole Prize (2008), the Fermat Prize (2011), and the Infosys Prize (2012). He is a Fellow of the Royal Society and a member of the inaugural class of AMS Fellows. Williams received her PhD from the Massachusetts Institute of Technology in 2005, advised by Richard Stanley. Her work involves algebraic, enumerative, and topological combinatorics and their connections with algebraic geometry, representation theory, and physics—in particular, total positivity, cluster algebras, statistical mechanics, and tropical geometry. She is currently Dwight Parker Robinson Professor of Mathematics at Harvard and Sally Starling Seaver Professor at the Radcliffe Institute. Her honors include a Sloan Research Fellowship (2009–2011), a National Science Foundation CAREER Award (2011–2016), a Simons Fellowship (2014), and the AWM-Microsoft Research Prize in Algebra and Number Theory. She is a Fellow of the AMS. Lim received his PhD from Stanford University in 2007, advised by Gene Golub and Gunnar Carlsson. He is currently Professor of Computational and Applied Mathematics Initiative in the Department of Statistics at Chicago. His research interests are in applied algebraic geometry, applied topology, manifold optimization, and multilinear algebra. His honors include an NSF Faculty Early Career Development Award (2011–2016), an Air Force Office of Scientific Research Young Investigator Award (2013–2016), the Stephen Smale Prize (2017), the SIAM Wilkinson Prize (2017), and the Hans Schneider Prize (2019). He is a Fellow of the AMS.

—*Elaine Kehoe*

ANZIAM Awards

Australian and New Zealand Industrial and Applied Mathematics (ANZIAM) has made a number of awards for 2022. **Phil Broadbridge**, emeritus professor of LaTrobe University, received the ANZIAM Medal, the highest award of the organization, for “outstanding and innovative contributions to research, pioneering novel methods for finding exact solutions to difficult nonlinear partial differential equations that arise in a wide variety of important applications.” His research interests include theoretical hydrology, metal surface evolution, heat conduction and Stefan free boundary problems, quantum mechanics of unstable systems, cosmology, symmetry methods for nonlinear partial differential equations, mathematical biology, financial mathematics, and combustion. **James McCaw** of the University of Melbourne was awarded the E. O. Tuck Medal for outstanding research and distinguished service to the field of applied mathematics. His research interests cover dynamical systems, stochastic processes, numerical and computational simulation, and Bayesian data analysis, and he has engaged in cross-disciplinary research in developing

mathematical and statistical models in biology. **Elliot Carr** of the Queensland University of Technology was awarded the J. H. Michell Medal, which is given to an outstanding new researcher who has undertaken distinguished research in applied and/or industrial mathematics, with a significant proportion of the research being done in Australia and/or New Zealand. His research focuses on developing and applying mathematical/computational models, techniques, and algorithms to simulate, solve, and analyze physical problems, particularly those governed by partial differential equations.

—*From ANZIAM announcements*

Jentzen Awarded 2022 Traub IBC Prize

Arnulf Jentzen of the University of Münster and the Chinese University of Hong Kong has been selected the recipient of the 2022 Joseph F. Traub Prize for Achievement in Information-Based Complexity (IBC) for outstanding contributions to the field. Jentzen received his PhD in 2009 from Goethe University Frankfurt. He held positions at Bielefeld University, Princeton University, and ETH Zurich before joining the faculty at Münster in 2019 as full professor. His research areas include dynamical systems and gradient flows, analysis of partial differential equations, stochastic analysis, machine learning, and numerical analysis. The prize carries a cash award of US\$3,000.

—*Erich Novak*
Journal of Complexity

2021 AAAS Fellows Elected

The American Association for the Advancement of Science has elected its class of Fellows for 2021.

The new Fellows of the Section on Mathematics are:

- **Dan Abramovich**, Brown University
- **Helene Barcelo**, Mathematical Sciences Research Institute
- **Robert Bryant**, Duke University
- **Fariba Fahroo**, US Air Force Office of Scientific Research
- **Philip K. Maini**, University of Oxford (United Kingdom)
- **Jill C. Pipher**, Brown University
- **Judy Leavitt Walker**, University of Nebraska-Lincoln

The new Fellows of the Section on Statistics are:

- **Veerabhadran Baladandayuthapani**, University of Michigan
- **Valen Earl Johnson**, Texas A&M University
- **Mingyao Li**, University of Pennsylvania
- **Tapabrata (Taps) Maiti**, Michigan State University
- **Sarah Nusser**, Iowa State University

- **Annie Qu**, University of California, Irvine
- **Nalini Ravishanker**, University of Connecticut
- **Luke Tierney**, University of Iowa

—From an AAAS announcement

2022 SIAM Fellows Elected

The Society for Industrial and Applied Mathematics (SIAM) has elected its class of fellows for 2022. Their names, institutions, and the work for which they were recognized follow.

- **Remi Abgrall**, Universität Zürich, for fundamental contributions to the development of numerical methods for conservation laws, in particular for multifluid flows and residual distribution schemes.
- **Sharon F. Arroyo**, The Boeing Company, for leadership in, promotion of, and contributions to the industrial practice of operations research.
- **Weizhu Bao**, National University of Singapore, for modeling and simulation for Bose–Einstein condensation and multiscale methods and analysis for highly oscillatory dispersive PDEs.
- **Bonnie Berger**, Massachusetts Institute of Technology, for pioneering work in computational molecular biology, including comparative and compressive genomics, network inference, genomic privacy, and protein structure prediction.
- **Zhiming Chen**, Chinese Academy of Sciences, for significant contributions to adaptive finite element methods, multiscale analysis and computation, and seismic imaging.
- **James Michael Crowley**, Society for Industrial and Applied Mathematics, for service to SIAM and the applied mathematics and computational science community.
- **James H. Curry**, University of Colorado, Boulder, for pioneering work in computational dynamics and for mentorship of young researchers, particularly in the African American community.
- **Zlatko Drmač**, University of Zagreb, for contributions to algorithms with high relative accuracy in numerical linear algebra, model reduction, and system identification.
- **Chen Greif**, University of British Columbia, for contributions to scientific computing, especially in numerical linear algebra and its applications.
- **Abba B. Gumel**, Arizona State University, for stellar contributions to mathematical biology, particularly the modeling of epidemics, and applications to other public health problems.
- **Eldad Haber**, University of British Columbia, for contributions in computational inverse problems, differential equations, statistical and optimization techniques, deep learning, and multiscale methods.
- **John Robert King**, University of Nottingham, for contributions to asymptotic methods and systems biology.

- **Daniel Kressner**, École Polytechnique Fédérale de Lausanne, for contributions in numerical linear and multilinear algebra and scientific computing.
- **Jose Nathan Kutz**, University of Washington, for contributions to applied dynamical systems, machine learning, and nonlinear optics.
- **Lek-Heng Lim**, University of Chicago, for pioneering contributions to numerical multilinear algebra and for introducing high-level algebra, geometry, and topology to applied mathematics.
- **Fang-Hua Lin**, New York University, for significant contributions to our understanding of the properties of solutions throughout nonlinear partial differential equations.
- **Peter B. Monk**, University of Delaware, for contributions to inverse scattering and the development and analysis of finite element methods for problems in acoustics and electromagnetism.
- **Houman Owhadi**, California Institute of Technology, for outstanding contributions in statistical numerical approximation, kernel learning, and uncertainty quantification.
- **Keith Promislow**, Michigan State University, for contributions to rigorous asymptotic reductions, development of novel models and their applications, and service to the applied mathematics community.
- **Rosemary Anne Renaut**, Arizona State University, for contributions to ill-posed inverse problems and regularization, geophysical and medical imaging, and high-order numerical methods.
- **Wil Schilders**, Eindhoven University of Technology, for impressive contributions to industrial mathematics through semiconductor device simulation, iterative methods for the solution of linear systems, and model order reduction methods.
- **Leonard J. Schulman**, California Institute of Technology, for seminal contributions to coding theory, quantum computing and matrix analysis, and outstanding service.
- **Amit Singer**, Princeton University, for foundational contributions to mathematical data analysis and the mathematics of cryo-electron microscopy.
- **Gabriele Steidl**, Technische Universität Berlin, for contributions to computational harmonic analysis and imaging sciences.
- **Raymond Tuminaro**, Sandia National Laboratories, for contributions in iterative linear solver algorithms and software to address scientific computing applications on large-scale parallel systems.
- **Hongkai Zhao**, Duke University, for seminal contributions to scientific computation, numerical analysis, and applications in science and engineering.

—SIAM announcement

National Academy of Engineering Elections

The National Academy of Engineering (NAE) has elected its new members and international members for 2022. Following are the newly elected members whose work involves the mathematical sciences.

- **Anna Karlin**, University of Washington, for contributions to the design and analysis of randomized algorithms and their impact on computer systems and the Internet.
- **George Em Karniadakis**, Brown University, for computational tools, from high-accuracy algorithms to machine learning, and applications to complex flows, stochastic processes, and microfluidics.
- **Robert J. Madix**, Harvard University, for development of quantitative models for predicting catalytic selectivity through fundamental understanding of reaction mechanism and kinetics.
- **Michele Viola Manuel**, University of Florida, for contributions to research, implementation, and teaching of computational materials design of biomimetic self-healing metals and high-performance lightweight alloys.

— From an NAE announcement

Hertz Fellowships Awarded

The Fannie and John Hertz Foundation has made graduate fellowship awards for 2020 and 2021. The Fellows whose work involves the mathematical sciences are: **Marisa Gaetz** (2020; Massachusetts Institute of Technology); **Maya San- kar** (2020; Stanford University); **Vikram Sundar** (2020; Massachusetts Institute of Technology); and **John Cherian** (2021; Stanford University). The Fellows receive up to five years of academic support valued at up to US\$250,000 to pursue innovative research without constraints.

—From a Hertz Foundation announcement

Regeneron Science Talent Search

The Regeneron Science Talent Search (STS) was held in person in 2022 under strict COVID-19 protocols. The following young scientists whose work involves the mathematical sciences are among the top ten winners in the 2022 Talent Search.

Amber Luo of Ward Melville High School, Stony Brook, New York, was awarded third place for her project, in which

she created a computational tool to reveal how ribosomes move along a cell's mRNA transcript to produce proteins. Her new approach, called RiboBayes, couples a powerful algorithm and statistical techniques to reveal vital information about ribosome pause sites; current algorithms are unable to efficiently and accurately locate these key pause sites on a large scale. Luo received a cash award of US\$150,000.

Daniel Larsen of Bloomington High School, Bloomington, Indiana, was awarded fourth place for his project, "Bertrand's Postulate for Carmichael Numbers." Prime numbers are crucial for cryptography, where large primes help keep communication secure. A tool useful in finding primes is called Fermat's little theorem, a test that all prime numbers pass. Carmichael numbers are those that pass this test yet are not actually prime, and so are sometimes called Fermat's pseudoprimes. Larsen showed that for any number, there is always a Carmichael number hidden between it and its double, if the number is large enough. Larsen received a cash award of US\$100,000.

Luke Robitaille of Robitaille Homeschool, Euless, Texas, was awarded tenth place for his mathematics project, "Topological Entropy of Simple Braids." Mathematical braids are a formal way of describing and tabulating the patterns that can arise from intertwining multiple lengths of string. Braids that intertwine lengths of string can become very complicated, and so mathematicians use the concept of topological entropy to compare braids to each other. Topological entropy describes how complicated a given braid is by assigning each braid a number that is always either positive or zero. Robitaille showed that for low numbers of strands, most simple braids are orderly, but as the number of strands grows large, nearly all simple braids are chaotic. This shows that a random simple braid will never be too simple, topologically speaking, if you have a lot of strands braided together. Braid theory has recently been used to better understand the chaotic mixing of fluids. Robitaille received a cash award of US\$40,000.

The Regeneron STS is the United States' oldest and most prestigious science and mathematics competition for high school seniors. It is administered by the Society for Science and sponsored by the biotechnology company Regeneron.

—From a Regeneron STS announcement

Credits

Photo of Tim Austin is courtesy of Katherine Smith.

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