Mathematics People

Ulcigrai Awarded Brin Prize


Corinna Ulcigrai

Corinna Ulcigrai of the University of Zürich has been awarded the ninth Michael Brin Prize in Dynamical Systems for her "fundamental work on the ergodic theory of locally Hamiltonian flows on surfaces, of translation flows on periodic surfaces and windtree models, and her seminal work on higher genus generalizations of Markov and Lagrange spectra." The work for which she was honored includes the articles "Absence of Mixing in Area-Preserving Flows on Surfaces," *Annals of Mathematics* **173** (2011), "Non-ergodic $\mathbb{Z}$-Periodic Billiards and Infinite Translation Surfaces," *Inventiones Mathematicae* **197** (2014) (with K. Fraçzek), and "Lagrange Spectra in Teichmüller Dynamics via Renormalization," *Geometric and Functional Analysis* **25** (2015). Ulcigrai received her PhD in 2007 from Princeton University under the direction of Yakov Sinai. She held a position at the University of Bristol (2007–2019) and has been at the University of Zürich since 2018. Her honors include the European Mathematical Society Prize in 2012 and the Whitehead Prize in 2013.

The Brin Prize was endowed in 2008 by Michael Brin of the University of Maryland to recognize mathematicians who have made substantial impact in dynamical systems and related fields at an early stage of their careers. The prize is awarded for specific contributions and currently carries a cash award of US$18,000.

—Giovanni Forni, Chair, Prize Selection Committee

ICA Medals Awarded

The Institute of Combinatorics and Its Applications (ICA) has awarded medals to the following mathematicians.

Charles Colbourn of Arizona State University was awarded the 2019 Stanton Medal for significant lifetime contributions to promoting the discipline of combinatorics. The prize citation reads in part: "Dr. Charles Colbourn has been a tireless lifelong champion for the discipline of combinatorics, with his efforts especially focused in the design theory community. He was instrumental in the founding of the *Journal of Combinatorial Designs*, which filled a void that had existed in the journal landscape prior to its inception. He has served as one of the editors-in-chief of *JCD* since 1993 and has promoted it to be the flagship journal of design theory and a highly respected journal throughout the mathematics community. He also serves in an editorial role on a large number of other journals in combinatorics and related fields. He was the coeditor (with Jeff Dinitz) of the first (1996) and second (2006) editions of the *Handbook of Combinatorial Designs*, now widely considered to be an indispensable reference by researchers in design theory. Dr. Colbourn is a great advocate for design theory and combinatorics. He attends a huge number of conferences in a wide variety of fields, very often as an invited speaker, and always makes a compelling case for the importance of design theory to the relevant field. He has provided invaluable mentoring for a great many young combinatorialists who have developed into active members of the combinatorics community. He chaired the Medals Committee of the ICA from 2016 to 2019." Colbourn received his PhD from the University of Toronto in 1980. He was awarded the ICA Euler Medal for Lifetime Research Achievement in 2003. When not engaged in mathematics and computing, his favorite pastime is reading history, general science, and nineteenth-century English novels.


Charles Colbourn


Koen Thas

Koen Thas of Ghent University was awarded a 2019 Hall Medal, which recognizes extensive quality research with substantial international impact by Fellows of the ICA in midcareer. The citation reads in part: "Koen Thas has made significant contributions in the areas of finite geometry and absolute geometry and has addressed important problems in mathematical physics and quantum information theory using geometric and group-theoretic methods. He has solved a number of fundamental open

problems by eminent researchers. In his work linking algebraic geometry over F_1 and combinatorics, he was one of the first in almost forty years to contribute new substantial results to infinite Singer theory." Thas received his PhD in 2002 and was awarded an ICA Kirkman Medal in 2006 and the Triennial Prize of the Flemish Science Foundation for Exact Sciences in 2009. Thas tells the *Notices*: "I was born in Ghent, and lived in Nazareth—of all places—till I moved to Ghent again, and stayed in its surroundings. I was a drawing prodigy as a very young child, and once caused a 'visitor jam' in the Galleria dell'Accademia, drawing variations of Michelangelo's *David* as a ten-year-old. My thirst for creation in both the visual arts and writing never left me. But mathematics entered my space as well, and introduced new textures to my general sketch."


Jeroen Schillewaert

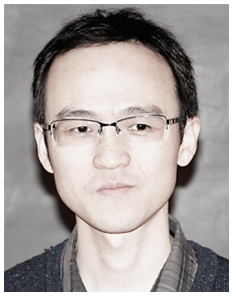
Jeroen Schillewaert of the University of Auckland also was honored with a Hall Medal for 2019.The citation reads: "Jeroen Schillewaert has made significant contributions to a broad range of topics in combinatorics and finite geometry, combining techniques from extremal and probabilistic combinatorics, linear algebra, and group theory. He is a world expert on buildings, the combinatorial and geometric structures introduced by Jacques Tits. His work has applications in coding theory and cryptography." He received his PhD from the University of Ghent in 2009, and he was awarded an Oberwolfach Leibniz Fellowship, a Marie Curie Fellowship, and an Alexander von Humboldt Fellowship. Schillewaert tells the *Notices*: "I grew up in De Haan, Belgium and still live near a beach with my fiancee Emma in Takapuna, New Zealand. I like a wide variety of sports, including tennis and soccer. These tend to make me hungry and thirsty."

Tao Zhang of Guangzhou University was awarded the 2019 Kirkman Medal, which recognizes excellent research by Fellows or Associate Fellows of the ICA early in their research careers. The citation reads: "Dr. Tao Zhang has made deep contributions to lattice tilings and their applications, algebraic coding theory, and design theory. His notable research achievements include a significant advance on the Golomb–Welch conjecture on lattice tilings and the construction of new classes of quantum error-correcting codes with large minimum distance. Dr. Zhang's research has resulted in more than twenty published papers in top-ranked discrete mathematics and electrical engineering journals. He has given ten conference and workshop talks, including a plenary address and an invited talk. The excellence of his doctoral dissertation was recognized with awards from Zhejiang University and Zhejiang Province. His nominators describe him as 'a very original, passionate, and hard-working researcher,' and attest that 'the depth and breadth of Tao Zhang's research are very impressive.'"

—From ICA announcements

Clay Research Awards Presented

The Clay Mathematics Institute (CMI) has presented its Research Awards for 2019 to four mathematical scientists. The awards celebrate outstanding achievement in the mathematical sciences.


Wei Zhang

Wei Zhang of the Massachusetts Institute of Technology was selected "in recognition of his groundbreaking work in arithmetic geometry and arithmetic aspects of automorphic forms." The prize citation reads, "His landmark contributions include a proof of the global Gan–Gross–Prasad Conjecture for a wide class of automorphic representations of unitary groups, a proof with Zhiwei Yun of a higher-order generalization of the Gross–Zagier formula over function fields, and a proof of Kolyvagin's conjecture on the structure of Selmer groups for a large class of elliptic curves over **Q**. He has formulated an arithmetic version of the Gan–Gross–Prasad Conjecture—a vision for a far-reaching generalization of the Gross–Zagier formula over number fields—and pioneered a relative trace formula approach to its proof. He recently achieved a major step in this program by proving the Arithmetic Fundamental Lemma." Zhang received his PhD from Columbia University in 2009. His honors include the 2010 SASTRA Ramanujan Prize and the 2018 New Horizons in Mathematics Prize. He is a Fellow of the AMS. He tells the *Notices*: "I grew up in Sichuan, China, and thus I am a big fan of spicy food owing to my hometown cuisine. Aside from math, I enjoy spending time with my family, practicing Chinese calligraphy, and playing tennis."


Tristan Buckmaster

Tristan Buckmaster of Princeton University, **Philip Isett** of the California Institute of Technology, and **Vlad Vicol** of the Courant Institute of Mathematical Sciences were jointly honored with a Clay Research Award "in recognition of the profound contributions that each of them has made to the analysis of partial differential equations, particularly the Navier–Stokes and Euler equations." The citation continues: "Buckmaster and Vicol changed


Vlad Vicol

perceptions of the nature of weak solutions to the Navier–Stokes equations by proving that such solutions can be remarkably wild—severely nonsmooth and highly nonunique. With a series of breakthroughs, Isett finally settled Onsager's 1949 Conjecture that, in turbulent regimes, below a specific regularity threshold, solutions to Euler's equations can be energy dissipative. Both works solve long-standing problems of fundamental importance. In the course of doing so, they introduce novel ideas in hard analysis, building on the program of De Lellis and Székelyhidi, inspired by the pioneering work of Nash and Gromov." Buckmaster received his doctorate from the University of Leipzig/Max Planck Institute for Mathematics in the Sciences in 2014. He taught at the Courant Institute before joining the Princeton faculty in 2017. Isett received his PhD from Princeton University in 2013 and has taught at MIT and the University of Texas at Austin prior to joining the faculty at Caltech in 2018. Vicol received his PhD from the University of Southern California in 2010. He taught at the University of Chicago and Princeton University before joining the faculty at the Courant Institute in 2018.

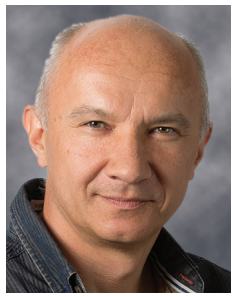
—From CMI announcements

2019 Micius Quantum Prizes

The Micius Quantum Prizes recognize scientists who have made outstanding contributions in the field of quantum communications, quantum simulation, quantum computation, and quantum metrology. The prizes for 2019 were awarded to the following.


Gilles Brassard

Charles H. Bennett of the Thomas J. Watson Research Center and **Gilles Brassard** of the University of Montreal were honored "for their inventions of quantum key distribution, quantum teleportation, and entanglement purification." Bennett received his PhD from Harvard University in 1971. Brassard received his PhD in theoretical computer science from Cornell University in 1979. He is a Fellow of the Royal Society of Canada and of the Royal Society of London, and he received the Wolf Prize in Physics in 2018. Brassard and Bennett, along with Peter Shor, were awarded the BBVA Foundation Frontiers of Knowledge Award in Basic Sciences earlier this year for their contributions to the field of quantum computation and communication, involving work in mathematics, physics, and computer science.


Artur Ekert

Artur Ekert of the Centre for Quantum Technologies, National University of Singapore, and the University of Oxford was selected "for his inventions of entanglement-based quantum key distribution, entanglement swapping, and entanglement purification." He received his PhD from the University of Oxford and is a Fellow of the Royal Society of London.


Anton Zeilinger

Jian-Wei Pan of the University of Science and Technology of China and **Anton Zeilinger** of the University of Vienna were honored "for their groundbreaking experiments in multi-photon interferometry and free-space quantum transmission that enabled practically secure and large-scale quantum communications." Pan received his PhD from the University of Vienna in 1999. His honors include the Emmy Noether Research Award (2004), the Sofja Kovalevskaja Award (2004), and the Chinese Young Scientist Prize (2006). He is a member of the Chinese Academy of Sciences and the World Academy of Sciences. Zeilinger received his doctorate from the University of Vienna in 1971 and has served on the faculties of the Technical University of Vienna and the University of Innsbruck as well as Vienna. He received the Wolf Prize in Physics in 2010. In his spare time he enjoys sailing.

Stephen Wiesner of Israel was also recognized "for his original conceptual idea on conjugate coding that inspired the discovery of practical quantum cryptography."

The prizes carry cash awards of 1 million Chinese yuan (approximately US$141,000).

—From a Micius Quantum Foundation announcement

Guggenheim Fellowship Awards to Mathematical Scientists

The John Simon Guggenheim Memorial Foundation has announced the names of the scholars, artists, and scientists who were selected as Guggenheim Fellows for 2020. Selected as fellows in the mathematical sciences were **Kavita Ramanan**, Brown University, applied mathematics, and

Martin H. Weissman, University of California, Santa Cruz, mathematics.

Guggenheim Fellows are appointed on the basis of impressive achievement in the past and exceptional promise for future accomplishments.

—From a Guggenheim Foundation announcement

National Academy of Sciences Elections

The National Academy of Sciences (NAS) has elected its new members for 2020. The names and institutions of the new members follow.

- **Ivet Bahar**, University of Pittsburgh
- **Abhijit Banerjee**, Massachusetts Institute of Technology
- **Gerard Ben Arous**, Courant Institute of Mathematical Sciences, New York University
- **Bonnie Berger**, Massachusetts Institute of Technology
- **Laura G. DeMarco**, Northwestern University
- **Ronald Fagin**, IBM Almaden Research Center
- **Katherine Freese**, University of Texas at Austin
- **Dennis Gaitsgory**, Harvard University
- **Robert L. Griess**, University of Michigan, Ann Arbor
- **Terence T. Hwa**, University of California, San Diego
- **Jacob Lurie**, Institute for Advanced Study
- **Wilfried Schmid**, Harvard University
- **Jeffrey D. Ullman**, Stanford University
- **Lai-Sang Young**, Courant Institute of Mathematical Sciences, New York University
- **Ofer Zeitouni**, Weizmann Institute of Science

Elected as International Associates were

- **Yoav Benjamini**, Tel Aviv University
- **Jürg Fröhlich**, Institut for Theoretical Physics, ETH Zürich

Berger, DeMarco, Griess, Schmid, and Zeitouni are members and Fellows of the AMS. Fagin is a member of the AMS.

—From an NAS announcement

AAAS Fellows Elected

The American Academy of Arts and Sciences (AAAS) has elected its new Fellows and foreign honorary members for 2020. The new Fellows in the section on Mathematics, Applied Mathematics and Statistics are:

- **Andrew Gelman**, Columbia University
- **Helmut Hofer**, Institute for Advanced Study
- **Xiao-Li Meng**, Harvard University
- **André Arroja Neves**, University of Chicago
- **Tatiana Toro**, University of Washington

The following new Fellows whose work involves the mathematical sciences were named in other AAAS sections:

- **Eva Silverstein**, Stanford University
- **Arogyaswami J. Paulraj**, Stanford University
- **Ronitt Rubinfeld**, Massachusetts Institute of Technology
- **Mihalis Yannakakis**, Columbia University
- **Alexander Razborov**, University of Chicago

Hofer and Toro are members and Fellows of the AMS. Neves and Razborov are members of the AMS.

—From an AAAS announcement

Fellows of the Royal Society

The Royal Society of London has announced the names of its newly elected Fellows for 2020. The new Fellows whose work involves the mathematical sciences are:

- **Yoshua Bengio**, University of Montreal
- **David Harel**, Weizmann Institute
- **Ehud Hrushovski**, University of Oxford
- **Hugh Osborn**, University of Cambridge
- **Raymond Pierrehumbert**, University of Oxford
- **Andrew Stuart**, California Institute of Technology
- **Jack Thorne**, University of Cambridge

Elected as a foreign member was **Wendelin Werner**, ETH Zürich.

—From a Royal Society announcement

MathWorks Math Modeling (M3) Challenge

The 2020 MathWorks Math Modeling (M3) Challenge (formerly the Moody's Mega Math Challenge) was held online in April 2020. This year's problem for the teams was to create a model to predict what percentage of semi trucks will be electric in the next few years and decades, to determine the number and locations of charging stations along major US trucking routes that are needed for an all-electric trucking industry, and to prioritize which routes should be developed with electric charging infrastructure first.

The Challenge Champions Team Prize of US$20,000 in scholarship money was awarded to a team from Pine View High School in Osprey, Florida. The team members were **Nicholas Butakow**, **Pragnya Govindu**, **Christiana Guan**, **Michael Gutierrez**, and **Kristoffer Selberg**. They were coached by Mark Mattia.

NEWS

The Challenge Runner-Up Team Prize of US$15,000 went to a team from White Station High School in Memphis, Tennessee. The team members were **Kevin Cao**, **Andrew Chen**, **Krishna Dasari**, **Kevin Luo**, and **Jonathan Zhang**. They were coached by Yanli Cui.

The Third Place Team Prize of US$10,000 was awarded to a team from Adlai E. Stevenson High School in Lincolnshire, Illinois. The team members were **Philena Liu**, **Brandon Lu**, **Sai Merneedi**, **Praneet Rathi**, and **Joshua Tsai**. Their coach was Paul Kim.

Finalist Team Prizes of US$5,000 were awarded to three teams. The team from Columbus North High School in Columbus, Indiana, consisted of **Samantha Heathcote**, **Vivek Hebbar**, **Anna Kim**, **Helen Rumsey**, and **Erica Song**; they were coached by Mike Spock. A second team from Pine View High School, Osprey, Florida, was awarded a Finalist Team Prize. This team consisted of **Alexander Douglas**, **Jack Gallahan**, **Vinay Konuru**, **Julia Kourelakos**, and **Danny McDonald** and were also coached by Mark Mattia. The team from Wayzata High School in Plymouth, Minnesota, consisted of **Brian Lin**, **George Lyu**, **Zachary Xiong**, **Andrew Yang**, and **Audrey Yang**. Their coach was William Skerbitz.

The M3 Challenge invites teams of high school juniors and seniors to solve an open-ended, realistic, challenging modeling problem focused on real-world issues. The top five teams receive awards ranging from US$5,000 to US$20,000 in scholarship money. The competition is sponsored by MathWorks, a developer of computing software for engineers and scientists, and is organized by the Society for Industrial and Applied Mathematics (SIAM).

—From a MathWorks/SIAM announcement

Credits

Photo of Corinna Ulcigrai is by Jos Schmid, Jos Schmid Photography Zurich, Switzerland.
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