

# Mathematics People

## \*NSF Division of Mathematical Sciences (DMS) New Rotating Program Directors

**Yuliya Gorb**, University of Houston, applied and computational mathematics, with particular emphasis on multi-scale analysis and simulations.

**Pamela Gorkin**, Bucknell University, functional analysis, operator theory, linear algebra, and complex analysis.

**Pawel Hitczenko**, Drexel University, probability theory and applications, particularly in combinatorics, discrete mathematics, and the analysis of algorithms.

**Michelle Manes**, University of Hawai`i at Mānoa, arithmetic dynamics and arithmetic geometry.

**Krishnan (Ravi) Shankar**, University of Oklahoma, Norman, Riemannian geometry and topological data analysis.

**Janet Striuli**, Fairfield University, commutative algebra, homological algebra, and representation theory.

**Branislav (Brani) Vidakovic**, Georgia Institute of Technology, Bayesian statistics, statistical modeling in wavelet domains, biostatistics, statistical analysis of signals/images, geoscientific and biomedical statistical applications.

**Huixia (Judy) Wang**, George Washington University, quantile regression, semiparametric regression, extreme value theory, high dimensional inference, and spatial data analysis.



Yuliya Gorb



Pamela Gorkin



Pawel Hitczenko



Michelle Manes



Krishnan (Ravi) Shankar



Janet Striuli



Branislav (Brani) Vidakovic



Huixia (Judy) Wang

—From letter dated August, 23, 2018,  
by Juan C. Meza, Director, NSF DMS.

See an interview with Meza in the October 2018 Notices.

## Kra Awarded Noether Lectureship



Bryna Kra

BRYNA KRA of Northwestern University has been selected to deliver the 2019 Noether Lecture by the Association for Women in Mathematics (AWM) and the AMS. She was honored for her “profound impact on mathematics, both through her work in the fields of dynamical systems and ergodic theory and through her service to the profession.”

The prize citation reads in part: “Kra is best known for her fundamental contributions to ergodic theory. Her 2005 joint paper with Bernard Host titled ‘Nonconventional Ergodic Averages and Nilmanifolds’ (*Annals of Mathematics*) settled a long-standing open problem on the existence of the limit of certain multiple ergodic averages, uncovering the role of nilpotent groups and their homogeneous spaces in analyzing configurations in sets of integers. The work inspired many further developments, including structure theorems in ergodic theory, in topological dynamics, and in combinatorics, convergence results for numerous multiple ergodic averages, and the uncovering of recurrence phenomena that imply the existence of patterns in sufficiently large sets of integers. In further work joint with Vitaly Bergelson and Host, they introduce the notion of a nilsequence and use it to provide further structural results in dynamics. It has been adapted to the combinatorial setting, playing an important role in studying patterns in smaller subsets of the integers, for example the set of primes. Continuing her work at the intersection of dynamics and combinatorics, Kra’s more recent research lies in topological and symbolic dynamics, studying systems of low complexity. In joint work with Van Cyr, she has the strongest work to date on Nivat’s Conjecture, relating a global property of periodicity of a two-dimensional configuration to a locally checkable property on the complexity.”

Kra received her PhD from Stanford University under the direction of Yitzhak Katznelson. She is a Fellow of the AMS and of the American Academy of Arts and Sciences. She has been the recipient of an AMS Centennial Fellowship and the Levi L. Conant Prize. She has given many invited lectures, including the AMS Arnold Ross Lecture. She is on the AMS Board of Trustees and has been a member of the Council and Executive Committee of the AMS and the Executive Committee of the AWM, among other service positions. She is an editor of the *Bulletin of the AMS*, as well as *Ergodic Theory and Dynamical Systems*, *Discrete and Continuous Dynamical Systems*, and *Discrete Analysis*.

—From an AWM announcement

## Prizes of the Mathematical Society of Japan

The Mathematical Society of Japan awarded a number of prizes for the fall of 2018.



Hirofumi Osada

HIROFUMI OSADA of Kyushu University has been awarded the Autumn Prize for his outstanding contributions to studies on stochastic dynamics of infinite particle systems with long range interaction and its rigidity. The Spring Prize and the Autumn Prize are the most prestigious prizes awarded by the MSJ to its members. The Autumn Prize is awarded without age restriction to people who have made exceptional contributions in their fields of research.

Their fields of research.

The Analysis Prizes were awarded to the following: SHUICHI KAWASHIMA of Waseda University for work on the stability analysis of systems of nonlinear partial differential equations with dissipative structure; to NORIO KONNO of Yokohama National University for work on the mathematics of quantum walks and its applications; to AKIHIKO MIYACHI of Tokyo Woman’s Christian University for study of Hardy spaces and boundedness for Fourier multiplier operators and pseudodifferential operators.

The Geometry Prizes were awarded to SHOUHEI HONDA of Tohoku University for work on geometric analysis on convergence of Riemannian manifolds and to YUJI ODAKA of Kyoto University for study on  $K$ -stability and moduli theory.

The Takebe Katahiro Prizes were awarded to the following: YOHEI FUJISHIMA of Shizuoka University for research on blow-up sets of solutions for the semilinear heat equation; to JOHANNES JAERISCH of Shimane University for research on ergodic theory and its intensive applications to various fields; to MASAYA MAEDA of Chiba University for work on the asymptotic stability of solitary waves for nonlinear Schrödinger equations; and to KIWAMU WATANABE of Saitama University for studies on the Campana-Peternell conjecture on Fano manifolds with nef tangent bundle.

The Takebe Katahiro Prizes for Encouragement of Young Researchers were awarded to the following: HIRAKU ATOBE of the University of Tokyo for automorphic representations and related local and global theta correspondences; to TAKAYUKI KOIKE of Osaka City University for work on function theory on a neighborhood of a complex submanifold and its application to geometry; to SHUTA NAKAJIMA of Kyoto University for research on first passage percolation; to YUSUKE NAKAMURA of the University of Tokyo for studies of minimal log discrepancy and the minimal model theory over a finite field; to GENKI OMORI of Saitama University for work on the group structure of the mapping class group of a surface and its subgroups; and to JIN TAKAHASHI of the Tokyo Institute of Technology for work on moving singularities for parabolic equations.

—From an MSJ announcement

## Lucia Awarded Rubio de Francia Prize



**Angelo Lucia**

ANGELO LUCIA of the California Institute of Technology has been awarded the 2017 José Luis Rubio Prize for important results in the mathematical aspects of quantum mechanics systems. In particular, his work focuses on studying mathematical models of systems composed of a large number of particles, in which their behavior responds to the rules of quantum mechanics. Lucia tells the *Notices*: “I

am a big fan of trains, especially long distance train trips. I have sometimes shocked people by arriving at conferences after a 24-hour train ride.” The prize is awarded by Royal Spanish Mathematical Society (RSMS) and is intended to recognize young Spanish researchers or researchers who have done their work in Spain.

—From an RSMC announcement

## Mohar Receives RSC Synge Award



**Bojan Mohar**

BOJAN MOHAR of Simon Fraser University has been awarded the John L. Synge Award of the Royal Society of Canada for his work in graph theory. The prize citation reads: “Bojan Mohar is a Slovenian-Canadian mathematician who holds a Canada Research Chair position at Simon Fraser University. He is one of the world leaders in graph theory and is well known for his solutions of open problems and conjectures. Interplay

of combinatorics, geometry, topology and algebra is visible in most of his work. His deep and transformative results in topological and structural graph theory made a lasting impact not only in topological graph theory but also in theoretical computing and other fields.” Mohar received his PhD from the University of Ljubljana in 1986. Since 2005, he has been a Canada Research Chair in Graph Theory at Simon Fraser University in Burnaby, British Columbia. He also holds his office at the Institute of Mathematics, Physics and Mechanics in his native Slovenia, where he returns regularly. The award is given at irregular intervals for outstanding research in any branch of the mathematical sciences.

Previous winners of the Synge Award are:

- James G. Arthur (1987)
- Israel M. Sigal (1993)
- Joel Feldman (1996)
- George A. Elliott (1999)

- Stephen Cook (2006)
- Henri Darmon (2008)
- Bálint Virág (2014)

—From an RSC announcement

## Prizes of the Canadian Mathematical Society

The Canadian Mathematical Society (CMS) has announced a number of awards for 2018.



**Thomas Hutchcroft**

THOMAS HUTCHCROFT of Cambridge University has been awarded the CMS Doctoral Prize. The citation reads in part: “Together with Asaf Nachmias, Hutchcroft has made remarkable progress in the study of uniform spanning trees on unimodular and planar graphs, answering several open questions raised in a celebrated paper by Benjamini, Lyons, Peres and Schramm. In a solo paper, Dr. Hutchcroft proved that critical percolation almost surely has only finite clusters on all transitive graphs of exponential growth. One of the central open problems in percolation is to prove this property for any transitive graph of at least quadratic growth, and Dr. Hutchcroft's work is an important step in this direction. In his research, Hutchcroft often uses tools from different branches of mathematics, including complex analysis, differential geometry and topology. For example, his paper with Omer Angel, Asaf Nachmias, and Gourab Ray combined hyperbolic triangulations, circle packings, random walks and mass transport in an ingenious way.” Hutchcroft received his PhD in 2017 from the University of British Columbia. The Doctoral Prize recognizes outstanding performance by a doctoral student from a Canadian university.



**Maksym Radziwill**

MAKSYM RADZIWILL of McGill University received the Coxeter-James Prize for his work in analytic number theory “focusing on the distribution of prime numbers, multiplicative functions and related objects,” including work with Matomäki that has had wide-ranging influence, for instance, on the resolution of the Erdős discrepancy problem by Terence Tao, and the first progress on Chowla's conjecture. The prize recognizes young mathematicians who have made outstanding contributions to mathematical research.



Keith Taylor

KEITH TAYLOR of Dalhousie University was honored with the 2018 Graham Wright Award for Distinguished Service. According to the prize citation, Taylor “has truly exemplified what this award represents, not just because of his excellent record of research and mentorship, but also through his academic work as associate dean, dean and associate vice president at two universities and through years of fundamental service to the CMS, including a term as president (2012–2014).” His outreach work focuses on “developing pathways to mathematical literacy for underrepresented groups in Saskatchewan and Nova Scotia, and consistently supporting and championing disadvantaged communities.” He has been the recipient of the Master Teacher Award from the University of Saskatchewan (2001), where he also championed the Math Readiness Project aimed at bridging the gap between high school and college/university mathematics, especially for students in remote areas. In 1996, Taylor was awarded the President’s Educational Site Award for the MRC web course at the University of Saskatchewan. The following year, he received the Student Union Teaching Excellence Award. Taylor received his PhD from the University of Alberta in 1976 under the direction of Anthony T.-M. Lau. Taylor tells the *Notices*: “I grew up on a farm and the life I have had in mathematics would have been totally unexpected by my teenage self. I remain astonished that one can earn a good living doing something that is this much fun. When taking a break from mathematics, I might be found on a golf course, in a bridge club, at the symphony, or playing with grandchildren.”



A.T. Lau

ANTHONY TO-MING LAU of the University of Alberta received the David Borwein Distinguished Career Award for his “exceptional, continued, and broad contributions to mathematics, from research central, to the development of abstract harmonic analysis in Canada and internationally, to teaching of such a high calibre that it has been recognized with a 3M Teaching Award, and award-winning service.”

Lau received his PhD degree from the University of British Columbia in 1969 and has been affiliated with the University of Alberta since that year. His first PhD student was Keith Taylor, recipient of the 2018 Graham Wright Award. Lau served as department chair of Mathematical and Statistical Sciences at the University of Alberta, as well as CMS President (2008–2010). He has served on editorial boards of more than ten journals, including the *Canadian Journal of Mathematics* and the *Canadian Mathematical Bulletin*. Lau tells the *Notices* that one of his childhood teachers helped him to come to the United States to study: “That was probably the best fortune I ever had,” he says. “After I finished Grade 11, she made arrangements for me to go to the U.S., to San Jose

City College.” He worked as a houseboy and at odd jobs to pay for his education. Lau’s wife, Alice, is a librarian, and his son and daughter are both engineering students.



Patrick Ingram

PATRICK INGRAM of York University and ANASTASIA STAVROVA of St. Petersburg State University have received G. de B. Robinson Awards for outstanding papers. Ingram was honored for his paper “Rigidity and Height Bounds for Certain Post-Critically Finite Endomorphisms of  $PN$ ,” (*Canadian Journal of Mathematics* **68** (2016), no. 3, 625–654)—according to the prize citation, “the first published work describing the arithmetic of post-critically finite self-maps for higher dimensional spaces.” Stavrova was honored for her paper “Non-stable  $K_1$ -functors for Multiloop Groups,” (*Canadian Journal of Mathematics* **68** (2016), no. 1, 150–178). According to the prize citation, her paper is a “fundamental contribution to group theory and Lie theory, which provides a deep understanding of the automorphism groups of multiloop Lie algebras in higher nullity.” The Robinson Awards are given for outstanding contributions to the *Canadian Journal of Mathematics* or the *Canadian Mathematical Bulletin*.

The Centre for Education in Mathematics and Computing (CEMC) at the University of Waterloo is the recipient of the 2018 Adrien Pouliot Award. The citation describes it as “one of Canada’s largest outreach organizations in mathematics and computer science. The focus of the center is to increase interest, enjoyment, confidence, and ability in mathematics and computer science among learners and educators in Canada and internationally.” The Pouliot Award is given for “significant and sustained contributions to mathematics education in Canada.”

—From CMS announcements

## 2018 Davidson Fellows

Several high school students whose projects involved the mathematical sciences have been named 2018 Davidson Fellows.



**Franklyn Wang**

Scholarships worth US\$25,000 were awarded to FRANKLYN WANG of Falls Church, Virginia, for his project “Monodromy Groups of Indecomposable Rational Functions” and to DAVID WU of Potomac, Maryland, for his project “Nonuniform Distributions of Patterns of Sequences of Primes in Prime Moduli.” Wang enjoys watching the New England Patriots and listening to Taylor Swift’s music. Wu reports that he recently took an ice skating class: “Considering I was slightly traumatized by breaking my wrist the first time I went ice skating, it went surprisingly smoothly. I can definitely see myself following my little sister’s footsteps—she’s actually good at ice skating.”



**David Wu**

A scholarship worth US\$10,000 was awarded to GRANT SHEEN of Irvine, California, for his project “An Alternating Minimization Method to

Train Neural Network Models for Brainwave Classification.” Sheen says: “Taking care of my grandmother during her final stages of Alzheimer’s disease inspired me to search for a solution to the communication issues that she suffered from. After researching electroencephalography (EEG), I spent the following years analyzing wireless EEG brainwave data of Alzheimer’s subjects, with the goal to make thought recognition a reality. I am an active volunteer at my local senior center. I am also a nationally-ranked foil fencer and have achieved a ‘B’ rating.”

The following students received honorable mentions: BRIAN HUANG, Fresh Meadows, New York, for “On Sufficient Conditions for Trapped Surfaces in Spherically Symmetric Spacetimes” and MICHAEL MA, Plano, Texas, for “New Results on Pattern-Replacement Equivalences: Generalizing a Classical Theorem and Revising a Modern Conjecture.”

The Davidson Fellows program, a project of the Davidson Institute for Talent Development, awards scholarships to students eighteen years of age or younger who have created significant projects that have the potential to benefit society in the fields of science, technology, mathematics, literature, music, and philosophy.

—From a Davidson Fellows announcement

## Royal Society of Canada Elections

The Royal Society of Canada (RSC) has elected two mathematical scientists to its 2018 class of new fellows in the Division of Mathematical and Physical Sciences. They are URI ASCHER of the University of British Columbia and RICHARD LOCKHART of Simon Fraser University.

—From an RSC announcement

### Photo Credits

NSF photos courtesy of the program directors.

Photo of Bryna Kra courtesy of Bryna Kra.

Photo of Hirofumi Osada courtesy of Hirofumi Osada.

Photo of Angelo Lucia courtesy of Jim Høyer, University of Copenhagen.

Photo of Bojan Mohar courtesy of Simon Fraser University.

Photos of Thomas Hutchcroft and Maksym Radziwill provided by Petra Lein © MFO.

Photo of Keith Taylor courtesy of Keith Taylor.

Photo of Patrick Ingram by Elisa Ross.

Photo of A. T. Lau courtesy of Mathematics Department, University of Alberta.

Photos of Franklyn Wang and David Wu courtesy of Davidson Institute for Talent Development.