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# Mathematics People

## 2013 Simons Investigators Named

The Simons Foundation has named thirteen mathematicians, theoretical physicists, and theoretical computer scientists as Simons Investigators for 2013. The Simons Investigators program provides a stable base of support for outstanding scientists, enabling them to undertake long-term study of fundamental questions. The names and institutions of the awardees whose work involves the mathematical sciences and brief excerpts from the prize citations follow.

NGÔ BO CHÂU of the University of Chicago produced a proof of the fundamental lemma, a deep conjecture of Langlands, that inaugurated a new geometric approach to problems in harmonic analysis based on arithmetic geometry. His ideas have already inspired work in many areas, including mathematical physics and geometric representation theory.

MARYAM MIRZAKHANI of Stanford University focuses her work on Teichmüller theory and dynamics of natural geometric flows over the moduli space of Riemann surfaces. One of her major results, in joint work with Eskin and Mohammadi, is a proof that stationary measures for the action of  $SL_2(\mathbb{R})$  on the space of flat surfaces are invariant, a deep and long-standing conjecture.

KANNAN SOUNDARARAJAN of Stanford University is one of the world's leaders in analytic number theory and related areas. His work is focused on understanding the zeros and value distribution of  $L$ -functions and on analyzing the behavior of multiplicative functions. In particular, his work (with his coauthors) has led to weak subconvexity bounds for general  $L$ -functions and to the proof of the holomorphic quantum unique ergodicity conjecture of Rudnick and Sarnak.

DANIEL TATARU of the University of California, Berkeley, has done deep and influential work on nonlinear waves. He proved difficult well-posedness and regularity results for many new classes of equations, including geometric evolutions such as wave and Schrödinger maps, quasilinear wave equations, some of which are related to general relativity, as well as other physically relevant models.

RAJEEV ALUR of the University of Pennsylvania is a leading researcher in formal modeling and algorithmic analysis of computer systems. A number of automata and logics introduced by him have now become standard models with great impact on both the theory and practice of verification. His key contributions include timed automata for modeling of real-time systems, hybrid automata for modeling discrete control software interacting with the continuously evolving physical environment, and visibly

pushdown automata for processing of data with both linear and hierarchical structure, such as XML documents.

PIOTR INDYK of the Massachusetts Institute of Technology is noted for his work on efficient approximate algorithms for high-dimensional geometric problems. This includes the nearest neighbor search in which, given a data point, the goal is to find points highly similar to it without scanning the whole data set. To address this problem, he codeveloped the technique of locality sensitive hashing, which proved to be influential in many applications, ranging from data mining to computer vision. He has also made significant contributions to sublinear algorithms for massive data problems. In particular, he has developed several approximate algorithms for massive data streams that use very limited space. Recently, he has codeveloped new algorithms for the sparse Fourier transform, which compute the Fourier transform of signals with sparse spectra faster than the FFT algorithm.

SALIL P. VADHAN of Harvard University has produced a series of original and influential papers on computational complexity and cryptography. He uses complexity-theoretic methods and perspectives to delineate the border between the possible and impossible in cryptography and data privacy. His work also illuminates the relation between computational and information-theoretic notions of randomness, thereby enriching the theory of pseudo-randomness and its applications.

Simons investigators are appointed for an initial period of five years with possible renewal for a further five years. Investigators receive research support of US\$100,000 per year, with an additional US\$10,000 per year provided to the investigator's department.

—*Simons Foundation announcement*

## 2013 Computer-Aided Verification Award Announced

KIM G. LARSEN, Aalborg University; PAUL PETERSSON, Mälardalen University; and WANG YI, Uppsala University, have been named the recipients of the 2013 Computer-Aided Verification (CAV) Award for the development of UPPAAL, a model checker for real-time systems, "which is the foremost tool suite for the automated analysis and verification of real-time systems."

The prize citation reads in part: "Correct functioning of a wide range of systems, from pacemakers to communication protocols, depends on the timing pattern of the interaction of the system with its environment. UPPAAL is an integrated tool for modeling, simulation, analysis, and verification of such real-time systems."

“In UPPAAL, a system is modeled as a network of timed automata, and the core analysis is performed by symbolic on-the-fly computation of reachable states of the system. The UPPAAL team has made significant conceptual advances on two fronts. First, the scalability of the core reachability analysis has improved dramatically due to the development of new data structures, new abstractions, and optimizations of basic operations used in the algorithm. Second, the model checker has been extended to perform automatic model-based testing (Uppaal-Tron), to analyze quantitative extensions of timed automata (Uppaal-Cora), and to synthesize controllers based on the theory of timed games (Uppaal-Tiga). The evolution of the UPPAAL tool suite has beautifully showcased what can be achieved by means of the fruitful interplay between novel theoretical research and attention to implementation details.

“In summary, UPPAAL is a real success story for the CAV community: while advances in the theory and tools underlying UPPAAL have been a mainstay of research papers published at CAV and related conferences over a twenty-year period, the resulting tool suite is a mature software that is being used for modeling, debugging, and verifying safety-critical systems in academia and industry. This success is mainly due to the creativity, enthusiasm, and sustained investment of time and effort by Kim Larsen, Paul Pettersson, and Wang Yi.”

The CAV award is given annually in recognition of a specific fundamental contribution or a series of outstanding contributions to the field of computer-aided verification and includes a cash prize of US\$10,000.

—*Rajeev Alur, University of Pennsylvania*

## NSF Postdoctoral Fellowships Awarded

The Mathematical Sciences Postdoctoral Research Fellowship Program of the Division of Mathematical Sciences (DMS) of the National Science Foundation (NSF) awards fellowships each year for postdoctoral research in pure mathematics, applied mathematics and operations research, and statistics. Following are the names of the fellowship recipients for 2013, together with their Ph.D. institutions (in parentheses) and the institutions at which they will use their fellowships.

STACEY ALEXEEFF (Harvard University), National Center for Atmospheric Research; MARK ALLEN (Purdue University), University of Texas; GRIGORI AVRAMIDI (University of Chicago), University of Utah; MATTHEW BORMAN (University of Chicago), Stanford University; NICHOLAS BRUBAKER (University of Delaware), University of Arizona; JOSE CARRION (Purdue University), Pennsylvania State University; YAIM COOPER (Princeton University), Harvard University; KEENAN CRANE (California Institute of Technology), Columbia University; MAX GLICK (University of Michigan), University of Minnesota; ELIZABETH GROSS (University of Illinois, Chicago), North Carolina State University; DANIEL HALPERN-LEISTNER (University of California, Berkeley), Columbia University; DANIEL HERNANDEZ (University of

Michigan), University of Utah; ANGELA HICKS (University of California, San Diego), Stanford University; JOSEPH HIRSH (City University of New York), Massachusetts Institute of Technology; THEODORE JOHNSON-FREYD (University of California, Berkeley), Northwestern University; JONATHAN KOMMEMI (University of Cambridge), Princeton University; HOLLY KRIEGER (University of Illinois, Chicago), Massachusetts Institute of Technology; ANDREW LAWRIE (University of Chicago), University of California, Berkeley; ROBERT LEMKE OLIVER (Emory University), Stanford University; SEAN LI (New York University), University of Chicago; BENJAMIN LINOWITZ (Dartmouth College), University of Michigan; ERIC MARBERG (Massachusetts Institute of Technology), Stanford University; DANI NEFTIN (Technion), University of Michigan; JOANNA NELSON (University of Wisconsin), Barnard College; ELLIOT PAQUETTE (University of Washington), Weizmann Institute of Science; STEFAN PATRIKIS (Princeton University), Harvard University; IGOR RAPINCHUK (Yale University), Harvard University; LAURA RIDER (Louisiana State University), Massachusetts Institute of Technology; ANDREW SANDERS (University of Maryland), University of Illinois, Chicago; HAYDEN SCHAEFFER (University of California, Los Angeles), University of California, Irvine; ADAM TOPAZ (University of Pennsylvania), University of California, Berkeley; THOMAS TROGDON (University of Washington), New York University; ROBIN TUCKER-DROB (California Institute of Technology), Rutgers University; JOHN ULLMAN (Massachusetts Institute of Technology), Stanford University; CHRISTOPHER VOGL (Northwestern University), University of Washington; PAUL VOUGA (Columbia University), Harvard University; BRENT WERNES (University of Chicago), University of Washington; WILLIAM YESSEN (University of California, Irvine), Rice University; and JOSHUA ZAHL (University of California, Los Angeles), Massachusetts Institute of Technology.

—*NSF announcement*

## SIAM Prizes Awarded

The Society for Industrial and Applied Mathematics (SIAM) has awarded a number of prizes for 2013.

STANLEY J. OSHER of the University of California, Los Angeles, has been named the John von Neumann Lecturer for 2013. The lectureship is awarded for outstanding and distinguished contributions to the field of applied mathematical sciences and for the effective communication of these ideas to the community. It carries a cash award of US\$5,000.

ANNA C. GILBERT of the University of Michigan was awarded the Ralph E. Kleinman Prize for outstanding research or other contributions that bridge the gap between mathematics and applications, particularly work that uses high-level mathematics and/or invents new mathematical tools to solve applied problems from engineering, science, and technology.

TYRONE DUNCAN of the University of Kansas has been awarded the W. T. and Idalia Reid Prize in Mathematics. This prize is awarded for research in or other contribu-

tions to the broadly defined areas of differential equations and control theory.

DOUGLAS N. ARNOLD of the University of Minnesota was awarded the SIAM Prize for Distinguished Service to the Profession. The prize is awarded to an applied mathematician who has made distinguished contributions to the furtherance of applied mathematics on the national level.

LEXING YING of Stanford University was awarded the James H. Wilkinson Prize in Numerical Analysis and Scientific Computing. The prize is awarded for research in or other contributions to numerical analysis and scientific computing during the six years preceding the award.

ANETTE HOSOI of the Massachusetts Institute of Technology was named the I. E. Block Community Lecturer. The lectureship is intended to encourage public appreciation of the excitement and vitality of science.

The SIAM Outstanding Paper Prizes have been awarded to the following researchers: ANDREW J. BERNOFF, Harvey Mudd College, and CHAD M. TOPAZ, Macalester College, for “A Primer of Swarm Equilibria”, *SIAM Journal on Applied Dynamical Systems*, vol. 10, issue 1 (2011), pp. 212–250; DANIEL KRESSNER and CHRISTINE TOBLER, ETH Zurich, for “Krylov Subspace Methods for Linear Systems with Tensor Product Structure”, *SIAM Journal on Matrix Analysis and Applications*, vol. 31, issue 4 (2010), pp. 1688–1714; ALEXANDER V. SHAPEEV, University of Minnesota, for “Consistent Energy-Based Atomistic/Continuum Coupling for Two-Body Potentials in One and Two Dimensions”, *SIAM Journal on Scientific Computing*, vol. 34, issue 3 (2012), pp. B335–B360. The prizes are awarded annually to the authors of three outstanding papers published in SIAM journals in the preceding three calendar years.

The SIAM Student Paper Prizes were awarded to the following students: JOSCHA GEDICKE, Humboldt University of Berlin, “An Adaptive Finite Element Eigenvalue Solver of Asymptotic Quasi-Optimal Computational Complexity”; KEIICHI MORIKUNI, Graduate University for Advanced Studies (Sokendai), Japan, “Inner-Iteration Krylov Subspace Methods for Least Squares Problems”; and VLADISLAV VORONINSKI, University of California, Berkeley, “PhaseLift: Exact and Stable Signal Recovery from Magnitude Measurements via Convex Programming”. A cash prize of US\$1,000 is awarded for each paper.

—From a SIAM announcement

## MAA Awards Presented

The Mathematical Association of America (MAA) presented several awards at its Summer MathFest in Hartford, Connecticut, in August 2013.

The Carl B. Allendoerfer Awards are made to authors of expository articles published in *Mathematics Magazine* and carry a cash prize of US\$500. The awardees for 2013 are: KHRISTO N. BOYADZHIEV, Ohio Northern University, “Close Encounters with the Stirling Numbers of the Second Kind”, *Mathematics Magazine* 85, no. 4 (2012), pp. 252–266; and ADRIAN RICE, Randolph-Macon College, and EZRA BROWN, Virginia Institute of Technology, “Why

Ellipses Are Not Elliptic Curves”, *Mathematics Magazine* 85, no. 3 (2012), pp. 163–176.

The Trevor Evans Award is made to authors of exceptional articles that are accessible to undergraduates and published in *Math Horizons*. It carries a cash prize of US\$250. The awardee for 2013 is MARGARET SYMINGTON, Mercer University, “Euclid Makes the Cut”, *Math Horizons* 19, no. 3 (2012), pp. 6–9.

The Halmos-Ford Award is made to authors of outstanding expository papers published in the *American Mathematical Monthly*. The awardees for 2013 are: ROBERT T. JANTZEN and KLAUS VOLPERT, both of Villanova University, “On the Mathematics of Income Inequality: Splitting the Gini Index in Two”, *American Mathematical Monthly* 119, no. 10 (2012), pp. 824–837; DIMITRIS KOUKOULOPOULOS, University of Montreal, and JOHANN THIEL, United States Military Academy, “Arrangements of Stars on the American Flag”, *American Mathematical Monthly* 119, no. 6 (2012), pp. 443–450; LIONEL LEVINE, Cornell University, and KATHERINE E. STANGE, University of Colorado, Boulder, “How to Make the Most of a Shared Meal: Plan the Last Bite First”, *American Mathematical Monthly* 119, no. 7 (2012), pp. 550–565; DAN KALMAN, American University, and MARK MCKINZIE, St. John Fisher College, “Another Way to Sum a Series: Generating Functions, Euler, and the Dilog Function”, *American Mathematical Monthly* 119, no. 1 (2012), pp. 42–51.

The Merten M. Hasse Prize is awarded for a noteworthy expository paper appearing in an MAA publication, at least one of whose authors is a younger mathematician, generally under the age of forty. The 2013 awardees are HEIKO VON DER MOSEL, RWTH Aachen University, and HENRYK GERLACH, “On Sphere-Filling Ropes”, *American Mathematical Monthly* 118, no. 10 (2011), pp. 863–876.

The George Polya Award is given for articles of expository excellence published in the *College Mathematics Journal* and carries a cash prize of US\$500. The 2013 awardees are: JACOB SIEHLER, Washington and Lee University, “The Finite Lamplighter Groups: A Guided Tour”, *College Mathematics Journal* 43, no. 3 (2012), pp. 203–211; DAVID APPLIGATE, AT&T, MARC LEBRUN, and NEIL J. A. SLOANE, OEIS Foundation, “Carryless Arithmetic Mod 10”, *College Mathematics Journal* 43, no. 1 (2012), pp. 43–50.

The Henry L. Alder Award for Distinguished Teaching by a Beginning College or University Mathematics Faculty Member honors beginning college or university faculty members whose teaching has been extraordinarily successful and whose effectiveness in teaching undergraduate mathematics is shown to have influence beyond their own classrooms. The award carries a cash prize of US\$1,000. The 2013 awardees are: KUMER DAS, Lamar University; CHRISTOPHER STORM, Adelphi University; and RACHEL LEVY, Harvey Mudd College.

The Mary P. Dolciani Award recognizes a pure or applied mathematician who is making a distinguished contribution to the mathematical education of K–16 students in the United States or Canada. The 2013 honoree is HYMAN BASS, University of Michigan.

—From an MAA announcement

## Prizes of the London Mathematical Society

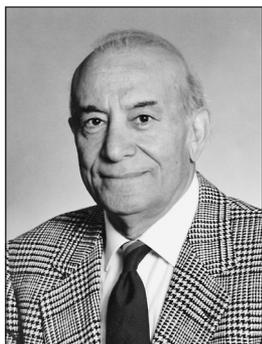
The London Mathematical Society (LMS) has awarded a number of prizes for 2013. The De Morgan Medal was awarded to JOHN THOMPSON of the University of Cambridge for his fundamental contributions to the understanding of the structure of finite groups, especially the finite simple groups. The Naylor Prize and Lectureship in Applied Mathematics was awarded to NICK TREFETHEN of the University of Oxford in recognition of his exceptional contributions to numerical analysis and his ability to communicate the subject to a wider audience. The Senior Whitehead Prize was awarded to FRANCES KIRWAN of the University of Oxford for her work on the geometric invariant theory and the geometry and topology of moduli spaces.

The Whitehead Prizes are given to mathematicians with less than fifteen years' experience at the postdoctoral level (allowing for career breaks). The Whitehead Prizes were awarded to: LUIS ALDAY, University of Oxford, for his work on properties of supersymmetric gauge theory and its connections with two-dimensional conformal field theory and with string theory in anti-de-Sitter space; ANDRE NEVES, Imperial College London, for his work in geometric analysis and in particular his resolution of the Willmore conjecture jointly with Fernando Coda Marques; TOM SANDERS, University of Oxford, for spectacular results in additive combinatorics and related areas, particularly for a paper obtaining the best-known upper bounds for sets of integers containing no three-term arithmetic progressions, for his work dramatically improving bounds connected with Freiman's theorem on sets with small doubling, and for other results in additive combinatorics and harmonic analysis; and CORINNA ULCIGRAI, University of Bristol, for her breakthrough results in dynamical systems.

—From an LMS announcement

## Yousef Alavi (1928–2013)

YOUSEF ALAVI, Western Michigan University professor emeritus of mathematics, died at age eighty-five on May 21, 2013, after several months of declining health.



Yousef Alavi

Born in Iran, he immigrated to the United States in 1948 to study at Michigan State University, where he earned a bachelor's degree in electrical engineering and master's and doctoral degrees in mathematics. He joined the mathematics faculty at Western Michigan University (WMU) in 1958 and taught for thirty-eight years, retiring in 1996.

Alavi brought great energy and enthusiasm to his work and had a keen talent for engaging

colleagues in joint efforts for the department, the university, and the mathematics profession. With his colleagues in graph theory he organized the International Conference on Graph Theory and Combinatorics, held at WMU every four years from 1968 to 2000. Alavi also directed three China-USA International Conferences on Graph Theory, held in both China and the United States from 1985 to 1993. While serving as department chair in 1989–1992, he supported the various area groups in the department by hosting research symposia held at WMU.

WMU honored Alavi with its University Distinguished Service Award in 1980 and its Alumni Teaching Excellence Award in 1996. He was the Ph.D. dissertation advisor for Jiuqiang Liu (1992). The Michigan Section of the MAA awarded him its first Distinguished Service Award in 1986 in recognition of his many years of service to the section. His service to the AMS included chairing the Public Information Committee for both the International Congress of Mathematicians at Berkeley in 1986 and the AMS Centennial celebration in Providence in 1988.

While Yousef Alavi achieved much professionally, his family was his first priority. He was dedicated to his wife, Hedy, and his son, Kayvon, who survive him. His friends and colleagues will remember him for his great energy, his kindness, and his good humor.

—Joseph Buckley and John Petro  
Western Michigan University

## Correction

The author footnote for Mike Eastwood's letter of nomination for Robert Bryant (Election Special Section, *Notices*, September 2013, page 1075) contained incorrect identifying information. It should have read "Mike Eastwood is professor of mathematics at the Australian National University College of Physical and Mathematical Sciences. His email address is mi chae l . eastwood@anu . edu . au."

—Sandy Frost