
Mathematics People

Walsh Awarded ICTP-IMU Ramanujan Prize

MIGUEL WALSH of the University of Oxford has been awarded the 2014 Ramanujan Prize of the Abdus Salam International Center for Theoretical Physics (ICTP), the Department of Science and Technology (DST, Government of India), and the International Mathematical Union (IMU). Walsh was recognized for his “outstanding contributions to ergodic theory and number theory, including a proof of the norm convergence of multiple polynomial or nilpotent ergodic averages, a long-standing problem in ergodic theory, and important results in inverse sieve problems leading to a sharp bound on the number of rational points on curves.”

Walsh was born in Buenos Aires, Argentina, in 1987. He received his Ph.D. from the University of Buenos Aires in 2012. He is the youngest recipient so far of the Ramanujan Prize. His research focuses on inverse problems in arithmetic combinatorics, the limiting behavior of ergodic averages, and the estimation of rational points on curves. He received the MCA Prize of the Mathematical Congress of the Americas in 2013 and is a current Clay Research Fellow.

The Ramanujan Prize is awarded annually to a researcher from a developing country who is younger than forty-five years of age on December 31 of the year of the award and who has conducted outstanding research in a developing country. Researchers working in any branch of the mathematical sciences are eligible. The prize carries a cash award of US\$15,000, and the recipient is invited to deliver a lecture at ICTP.

—*Elaine Kehoe*

Lichnerowicz Prize Awarded

DAVID LI-BLAND of the University of California Berkeley and IOAN MĂRCUȚ of the University of Illinois at Urbana-Champaign have been awarded the 2014 André Lichnerowicz Prize for notable contributions to Poisson geometry.

The prize citations read in part: “Li-Bland has made important contributions to Dirac and Poisson geometry. In his thesis, he introduced and studied the infinitesimal counterparts of Courant groupoids and Dirac groupoids.

In collaboration with Severa, he developed a theory of moduli spaces of flat connections on ‘quilted surfaces’, with varying structure groups for different regions of the surface. They found that these moduli spaces have natural quasi-Poisson structures and suggested a universal quantization scheme applicable in this setup. Other accomplishments include an integration procedure for exact Courant algebroids (with Severa), a classification of Dirac Lie groups (with Meinrenken), and the linear ‘derived’ symplectic category (with Weinstein).

“Mărcuț has made fundamental contributions to the global geometry of Poisson structures, most notably through his (semi-)local forms and rigidity results. Such results range from generalizations of Conn’s linearization theorem to explicit computations of moduli spaces of Poisson structures. First of all, he extended the geometric approach of Crainic-Fernandes, proving a generalization of Conn’s theorem around symplectic leaves. He also clarified and simplified the original analytic approach of Conn, making it available for the study of other geometric structures and allowing him to prove a much more general rigidity result (around Poisson submanifolds); as an application, he provided the first explicit computation of a nontrivial Poisson moduli space. Other accomplishments include a direct geometric proof of the existence of symplectic realizations (with Crainic), the study of obstructions and deformations of log-symplectic structures (with Osorno Torres), and the study of transversals in Poisson geometry (with Frejlich).”

David Li-Bland received his Ph.D. degree in mathematics from the University of Toronto in 2012 under the direction of Eckhard Meinrenken. He is currently an NSF Postdoctoral Fellow at Berkeley. Ioan Mărcuț received his Ph.D. degree in mathematics from the University of Utrecht in 2013 under the supervision of Marius Crainic. He is currently a Postdoctoral Fellow at the University of Illinois.

The Lichnerowicz Prize is awarded every two years at the International Conference on Poisson Geometry in Mathematics and Physics to researchers who have completed their doctorates at most eight years before the year of the conference.

—*From a Poisson Conference announcement*

2014 Computer-Aided Verification Award Announced

PATRICE GODEFROID, Microsoft Research; DORON PELED, Bar Ilan University; ANTTI VALMARI, Tampere University; and PIERRE WOLPER, Université de Liège, have been named the recipients of the 2014 Computer-Aided Verification (CAV) award “for the development of partial-order-reduction algorithms for efficient state-space exploration of concurrent systems.”

The prize citation reads in part: “Concurrency is omnipresent in computer systems, at all levels, from concurrent software running over multicore platforms to distributed applications running over large-scale networks. The automated verification of such systems is a challenging problem, due to the highly complex interactions between their components. Standard verification algorithms based on systematic state-space exploration face the well-known state-explosion problem when applied to such systems: the size of the state space of concurrent systems grows exponentially in the number of their components.

“A major approach for tackling this problem and developing scalable algorithms for automated verification of concurrent systems comes from so-called partial-order reduction (POR) techniques, which leverage the fact that there often are a huge number of computations that lead to the same observable states (i.e., states that are relevant for checking the property under consideration) but differ only in the order in which some parallel actions are interleaved. These actions are actually independent of one another (in the sense that they are not conflicting, so partially ordered), thus their total ordering in a particular execution is not relevant. Therefore the idea is to consider such computations as equivalent, so that only one representative of each equivalence class needs to be considered during the state-space exploration. The notion of independence was first formulated in 1977 by Antoni Mazurkiewicz and has been studied since then in the context of concurrency semantics by a number of authors. Nevertheless, it was not until the first half of the 1990s that these ideas have been applied in algorithmic verification.

“While the POR idea seems natural and simple in principle, the difficulty is in designing efficient search algorithms that determine on-the-fly, i.e., during the state-space exploration of the system, which branches to prune and which ones to explore, while ensuring (1) that redundant explorations are avoided and (2) that the state-space exploration is still complete, i.e., no computation equivalence class (modulo reordering of independent actions) is missed. In the period 1990–1994, Godefroid, Peled, Valmari, and Wolper investigated this problem and defined algorithms for solving it based on the notions of stubborn, sleep, and ample sets, respectively. These algorithms constitute the basis of the POR approach to model checking, which has been subsequently developed further, extended to various classes of systems, and integrated into several verification methods and tools. These tools are now widely used and applicable both in academia and industry. Indeed, several robust and influential verification

tools rely on POR, and this approach has been applied to many different contexts and continues to have impact to this day....

“In summary, POR is one of the major contributions to the field of automated verification in the last two decades. Its development contributed in a crucial way to make model checking successful and practically applicable to concurrent systems. This success is due to the seminal work that Godefroid, Peled, Valmari, and Wolper did in the first half of the 1990s.”

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

—Marta Kwiatkowska
University of Oxford

Beltrán and Braverman Awarded Second Smale Prize

The Society for the Foundations of Computational Mathematics has announced the awarding of the second Stephen Smale Prize to CARLOS BELTRÁN of the University of Cantabria and MARK BRAVERMAN of Princeton University. The Smale Prize was created to recognize the work of a young mathematician in the areas at the heart of the society’s interests and to help to promote his or her integration among the leaders of the scientific community.

Beltrán was honored “for his brilliant contributions to fundamental problems in the foundations of computational mathematics.” According to the prize citation, his work “embodies original approaches that combine the use of complex geometric structure and analytic power to make important progress on problems which have been the focus of intense research efforts by others. An important part of his work has been devoted to polynomial system solving, producing with Luis M. Pardo a Las Vegas algorithm for Smale’s seventeenth problem and studying the underlying geometry with Mike Shub and others. His work on producing equidistributed points on the sphere defines the state of the art on Smale’s seventh problem. With Anton Leykin, he has provided tools to adapt numerical methods to supply proofs in algebraic geometry. In addition, his work with Oscar González and Ignacio Santamaría on interference alignment (solving a problem in information theory, open for more than ten years) is also a milestone.”

Braverman was honored “for his pioneering work on the foundations of computational mathematics.” According to the prize citation, he “has made fundamental contributions to our understanding of computability and complexity questions involving both continuous and discrete systems. In particular, his joint work with Michael Yampolsky showed how to apply deep and modern techniques of complex analysis and dynamics to classify Julia sets according to their computability and complexity. Concerning discrete problems, in a series of papers Braverman and his collaborators have shown how

to apply Shannon's information theory to settle central open questions in communication complexity, including proving lower bounds on the ability of linear programs to approximate NP complete problems. He also developed surprising techniques from harmonic analysis to finally prove the Linial-Nisan conjecture and disproved, with collaborators, an old conjecture of Krivine."

—From a Society for the Foundations of Computational Mathematics announcement

Medina Receives SACNAS Award

HERBERT MEDINA of Loyola Marymount University has received the 2014 Distinguished Undergraduate Institution Mentor Award from the Society for Advancement of Hispanics/Chicanos and Native Americans in Science (SACNAS).

Medina received his Ph.D. from the University of California Berkeley and has published mathematical research in functional analysis, wavelets, and polynomial approximations (collaboratively with undergraduates). One of his passions is working to increase participation of historically underrepresented groups in science, technology, engineering, and mathematics (STEM). He is one of five founding codirectors of the Mathematical Sciences Research Institute Undergraduate Program (MSRI-UP) in Berkeley and was codirector (1998–2002) of the Summer Institute in Mathematics for Undergraduates (SIMU) in Puerto Rico.

—From a SACNAS announcement

Li Awarded Noether Lectureship

WEN-CHING WINNIE LI of Pennsylvania State University has been named the 2015 Noether Lecturer by the Association for Women in Mathematics (AWM). She was honored "for her work in number theory, which is impressive for its depth, the connections it makes between different areas of mathematics, and its continuing influence." She received her Ph.D. from the University of California Berkeley and is the author of more than one hundred publications, including two books. She received the 2010 Chern Prize for her outstanding contributions to mathematics. She is director of Taiwan's National Center of Theoretical Sciences, was a mentor for the Women Mentoring Program at the Institute for Advanced Studies in 1999 and the Banff International Research Station (BIRS) workshop on Women in Numbers in 2008, and was the Distinguished Women in Mathematics Lecturer at the University of Texas at Austin in 2011. She was named a Fellow of the AMS in 2013. Her research focuses on number theory, in particular modular forms and automorphic forms, as well as broad applications to coding theory and spectral graph theory. Li will deliver the Noether Lecture at the 2015 Joint Mathematics Meetings

in San Antonio, Texas. The lectureship, named in honor of Emmy Noether, honors women who have made fundamental and sustained contributions to the mathematical sciences.

—From an AWM announcement

Paenza Awarded 2014 Leelavati Prize

ADRIAN PAENZA of the University of Buenos Aires has been awarded the 2014 Leelavati Prize for outstanding contributions to public outreach in mathematics by an individual. The award was presented at the 2014 International Congress of Mathematicians (ICM) of the International Mathematical Union (IMU). It is given every four years at the ICM and is sponsored by Infosys.

Paenza was honored "for his decisive contributions to changing the mind of a whole country about the way it perceives mathematics in daily life, and in particular for his books, his TV programs, and his unique gift of enthusiasm and passion in communicating the beauty and joy of mathematics." He has been host of a long-running television program, *Científicos Industria Argentina* (Scientists Made in Argentina), which consists of interviews with mathematicians and scientists of very different disciplines and ends with a mathematical problem, the solution of which is given in the next program. He also hosted the program *Alterados por Pi* (Altered by Pi), a weekly half-hour show exclusively dedicated to the popularization of mathematics which is shown in public schools in Argentina. He has written a weekly newspaper column about science, particularly mathematics, as well as eight books dedicated to popularizing mathematics.

Paenza received his Ph.D. from the University of Buenos Aires, where he taught between 1979 and 2002 while also working as a sports journalist, eventually integrating mathematics with his journalism experience.

—From an ICM announcement

Golden Goose Award

PRESTON MCAFEE (Microsoft), PAUL MILGROM (Stanford University), and ROBERT WILSON (Stanford University) are the recipients of the 2014 Golden Goose Award for their research and work in complex auctions. They designed the Federal Communications Commission's first spectrum auction in 1994, a simultaneous multiple-round auction that was efficient and fair. The Golden Goose Award "highlights the often unexpected or serendipitous nature of basic scientific research by honoring federally funded researchers whose work may once have been viewed as unusual, odd, or obscure but which has produced important discoveries that have benefited society in significant ways." The AMS is a financial sponsor of the award.

—AMS announcement

SIAM Prizes Awarded

The Society for Industrial and Applied Mathematics (SIAM) awarded a number of prizes at its annual meeting in July 2014.

THOMAS D. TROGDON of the Courant Institute of Mathematical Sciences, New York University, was awarded the Richard C. DiPrima Prize. The prize is awarded every two years to a junior scientist who has done outstanding research in applied mathematics and who has completed his or her doctoral dissertation and all other requirements for his or her doctorate during the period running from three years prior to the award date to one year prior to the award date. Selection is based on the candidates' dissertations.

ADAM W. MARCUS of Yale University and Crispily, LLC; DANIEL A. SPIELMAN of Yale University; and NIKHIL SRIVASTAVA of Microsoft Research, India, were awarded the George Pólya Prize. The prize is given every two years alternately in two categories: (1) for a notable application of combinatorial theory or (2) for a notable contribution in another area of interest to George Pólya, such as approximation theory, complex analysis, number theory, orthogonal polynomials, probability theory, or mathematical discovery and learning.

ALAIN BENSOUSSAN of the University of Texas at Dallas and City University of Hong Kong was awarded the W. T. and Idalia Reid Prize in Mathematics. The prize is awarded for research in or other contributions to the broadly defined areas of differential equations and control theory.

WEINAN E of Princeton University and RICHARD D. JAMES of the University of Minnesota were awarded the Theodore von Karman Prize. The prize is awarded for a notable application of mathematics to mechanics and/or the engineering sciences made during the five to ten years preceding the award.

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

LESLIE F. GREENGARD of the Simons Foundation and the Courant Institute of Mathematical Sciences, New York University, was named the John von Neumann Lecturer. 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.

IRENE M. GAMBA of the University of Texas at Austin was awarded the AWM-SIAM Sonia Kovalevsky Lectureship. The lecture is intended to highlight significant contributions of women to applied or computational mathematics.

JOHN LOWENGRUB of the University of California Irvine was named the Julian Cole lecturer. The lectureship is awarded for an outstanding contribution to the mathematical characterization and solution of a challenging problem in the physical or biological sciences, or in engineering, or for the development of mathematical methods for the solution of such problems.

ARIEH ISERLES of the University of Cambridge was awarded the SIAM Prize for Distinguished Service to the Profession. The prize is awarded to an ap-

plied mathematician who has made distinguished contributions to the furtherance of applied mathematics on the national level.

SIAM Outstanding Paper Prizes are awarded for outstanding papers published in SIAM journals. The recipients were: ANDREA L. BERTOZZI of the University of California Los Angeles and ARJUNA FLENNER of the Naval Air Weapons Center for their paper "Diffuse Interface Models on Graphs for Classification of High Dimensional Data"; EMMANUEL J. CANDÉS of Stanford University, YONINA C. ELДАР of Technion, Israel, THOMAS STROHMER of the University of California Davis, and VLADISLAV VORONINSKI of the Massachusetts Institute of Technology for their paper "Phase Retrieval via Matrix Completion"; and YURI NESTEROV of Université Catholique de Louvain for "Efficiency of Coordinate Descent Methods on Huge-Scale Optimization Problems."

The SIAM Award in the Mathematical Contest in Modeling (MCM) is awarded to two of the teams judged "Outstanding" in the MCM, administered annually by the Consortium for Mathematics and Its Applications (COMAP). This year, for Problem A, the Continuous Problem, the awardees were YUAN GONG, SHU LIU, and YANDI SHEN, students at Zhejiang University, People's Republic of China. Their faculty advisor was Jianxin Zhu. For Problem B, the Discrete Problem, the student awardees were YIPING LIU, YONGYI XIE, and YAO ZHANG of Southwest University for Nationalities, People's Republic of China. Their advisor was Gaoping Li.

The SIAM Student Paper Prizes are awarded every year to the student author(s) of the most outstanding paper(s) submitted to the SIAM Student Paper Competition. The awardees were: SEAN P. CORNELIUS of Northwestern University for "Realistic Control of Network Dynamics," CARLOS FERNANDEZ-GRANDA of Stanford University for "Towards a Mathematical Theory of Super-Resolution," and IAIN SMEARS of Oxford University for "Discontinuous Galerkin Finite Element Approximation of Hamilton-Jacobi-Bellman Equations with Cordès Coefficients."

MAA Awards Presented

The Mathematical Association of America (MAA) presented a number of awards at its Summer MathFest in Portland, Oregon, in August 2014.

The Carl B. Allendoerfer Awards are made to authors of expository articles published in *Mathematics Magazine* and carry a cash award of US\$500. The awardees for 2014 are: SALLY COCKBURN, Hamilton College, and JOSHUA LESPERANCE, Oberlin College, "Deranged Socks," *Mathematics Magazine* 86, no. 2 (2013), pp. 97-109; and SUSAN H. MARSHALL and DONALD R. SMITH, Monmouth University, "Feedback, Control and the Distribution of Prime Numbers," *Mathematics Magazine* 86, no. 3 (2013), pp. 189-203.

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\$1,000. The 2014 awardee is JORDAN ELLENBERG,

University of Wisconsin, Madison, “The Beauty of Bounded Gaps,” *Math Horizons* **21**, no. 1 (2013), pp. 5–7.

The Halmos-Ford Award recognizes authors of articles of expository excellence published in the *American Mathematical Monthly*. It carries a cash prize of US\$1,000. The 2014 awardees are: WILL TRAVES, U.S. Military Academy, “From Pascal’s Theorem to d -Constructible Curves,” *American Mathematical Monthly* **120**, no. 10 (2013), pp. 901–915; TADASHI TOKIEDA, University of Cambridge, “Roll Models,” *American Mathematical Monthly* **120**, no. 3 (2013), pp. 265–282; JACQUES LÉVY VÉHEL, Inria, Regularity Team, and FRANKLIN MENDIVIL, Acadia University, “Christiane’s Hair,” *American Mathematical Monthly* **120**, no. 9 (2013), pp. 771–786; and SUSAN H. MARSHALL, Monmouth University, and ALEXANDER R. PERLIS, Louisiana State University, “Heronian Tetrahedra Are Lattice Tetrahedra,” *American Mathematical Monthly* **120**, no. 2 (2013), pp. 140–149.

The Annie and John Selden Prize for Research in Undergraduate Mathematics Education honors a researcher who has established a significant record of published research in undergraduate mathematics education and who has been in the field at most ten years. It carries a cash award of US\$500. The awardee for 2014 is MATTHEW INGLIS, Loughborough University.

The George Pólya Award is given for articles of expository excellence published in the *College Mathematics Journal*. It carries a cash award of US\$1,000. The awardees for 2014 are ADAM E. PARKER, Wittenberg University, “Who Solved the Bernoulli Differential Equation and How Did They Do It?” *College Mathematics Journal* **44**, no. 2 (2013), pp. 89–97; and CHRISTIANE ROUSSEAU, University of Montreal, “How Inge Lehmann Discovered the Inner Core of the Earth,” *College Mathematics Journal* **44**, no. 5 (2013), pp. 399–408.

The Henry L. Alder Awards 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 2014 honorees are DOMINIC KLYVE, Central Washington University, and LARA PUDWELL, Valparaiso University.

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 award carries a cash prize of US\$5,000. The 2014 honoree is ALAN SCHOENFELD, University of California Berkeley.

—From an MAA announcement

2014 International Mathematical Olympiad

The fifty-fifth International Mathematical Olympiad (IMO) was held in Cape Town, South Africa, July 3–13, 2014. The IMO is the preeminent mathematical competition for

high-school-age students from around the world. The IMO consists of solving six extremely challenging mathematical problems in a nine-hour competition administered over two days.

The team from the People’s Republic of China finished first. The United States team finished second, and the team from Taiwan finished third. Five members of the U.S. team were awarded gold medals. In alphabetical order, the gold medal winners for the United States were ALLEN LIU, Penfield High School, Penfield, New York; YANG LIU, Ladue Horton Watkins High School, St. Louis, Missouri; SAMMY LUO, North Carolina School of Science and Mathematics, Durham, North Carolina; MARK SELLKE, William Henry Harrison High School, Evansville, Indiana; and JAMES TAO, Illinois Math and Science Academy, Aurora, Illinois. JOSHUA BRAKENSIEK, homeschooled, Phoenix, Arizona, earned a silver medal. Sellke and Tao were gold medalists in the 2013 competition. The 2015 IMO will be held in Chiang Mai, Thailand, July 3–15, 2015.

—From an IMO announcement

Corrigendum

In our February 2014 *Notices* article, “Two-person fair division of indivisible items: An efficient, envy-free algorithm,” we mistakenly claimed that the algorithms BT and AL produce allocations of indivisible items that are “locally Pareto-optimal” (Theorem 5). The correct claim is that at least one of the allocations they produce is locally Pareto-optimal, but others may not be. Moreover, there may be allocations not produced by these algorithms that are Pareto-optimal as well as envy-free. For details, see our paper, “How to divide things fairly,” in which we analyze a simpler algorithm than AL that gives, like AL, a Pareto-optimal envy-free allocation if such an allocation exists:

<http://www.politics.as.nyu.edu/docs/IO/2578/SA9.pdf>

—Steven J. Brams, D. Marc Kilgour, and Christian Klamler