Mathematics People

Kitaev Receives MacArthur Fellowship

In September 2008 the MacArthur Foundation named twenty-five new MacArthur Fellows for 2008. Each will receive US$500,000 in "no strings attached" support over the next five years. Among the fellows is ALEXEI KITAEV of the California Institute of Technology.

Alexei Kitaev is a physicist who explores the mysterious behavior of quantum systems and their implications for developing practical applications, such as quantum computers. Since his days as an undergraduate he has made important theoretical contributions to a wide array of topics within condensed matter physics, including quasicrystals and quantum chaos, among others. More recently Kitaev has devoted considerable attention to the use of quantum physics for performing computation. Upon learning of the first algorithm for factoring numbers (an important aspect of cryptography) with quantum computers, he independently developed an alternative approach using "phase estimation", a solution that generalizes to an even wider range of calculations. At the quantum level, physical interactions often display bizarre, counterintuitive properties that are generally unobservable at the macroscopic level. Kitaev has shown how, under certain circumstances, macroscopic systems can maintain their quantum coherence, even in the presence of external noise. Though his work is focused mainly at the conceptual level, he also participates in efforts to develop working quantum computers. Through his deep insights into the fundamental nature of quantum physics, Kitaev reveals a rich picture of this unfamiliar world, bringing us closer to the realization of the full potential of quantum computing.

Alexei Kitaev received an M.S. (1986) from the Moscow Institute of Physics and Technology and a Ph.D. (1989) from the L. D. Landau Institute of Theoretical Physics in Chernogolovka, Russia. He is a professor of theoretical physics and computer science at the California Institute of Technology. Kitaev served previously as a researcher (1999–2001) at Microsoft Research and as a research associate (1989–1998) at the Landau Institute.

—From MacArthur Foundation announcements

Agrawal Receives Infosys Mathematics Prize

Infosys Technologies Ltd. (Infosys) and the National Institute of Advanced Studies (NIAS) today announced the first-ever winner of the Infosys Mathematics Prize. The winner of this prize for 2008 is MANINDRA AGRAWAL, N. Rama Rao Chair Professor in the Department of Computer Science and Engineering at the Indian Institute of Technology, Kanpur. Agrawal will be awarded 1 million rupees (approximately US$22,000) and a medal for his research in complexity theory.

The Infosys Mathematics Prize was jointly instituted by Infosys and NIAS earlier this year to encourage and foster an interest in mathematics. This prize is awarded to a nominated candidate who has made outstanding contributions—fundamental or applied—in any field of mathematics including the areas of pure mathematics, mathematical foundations of computer science and applied mathematics in natural, life, and social sciences.

Manindra Agrawal has been awarded the Infosys Mathematics Prize for his outstanding work in complexity theory, the branch of mathematics concerned with the study of algorithms for solving mathematical and related scientific problems, especially their efficiency and running times. Agrawal is best known for the discovery of a deterministic polynomial time algorithm for primality testing, in his joint paper with his former students. This discovery resolved a long-standing problem of a fast test of primality, which had been the subject of intense study in the field of mathematics and computer science research.

The prize jury consisted of S. R. Srinivasa Varadhan (chair), George C. Papanicolaou, Peter C. Sarnak, Alain Bensoussan, Shigefumi Mori, and M. S. Narasimhan.

—From an Infosys news release

Bartels and Görtz Awarded von Kaven Prize

ARTHUR BARTELS of the University of Münster and ULRICH GÖRTZ of the University of Bonn have been awarded 2008

von Kaven Prizes in Mathematics of the von Kaven Foundation, which is administered by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation). The prizes carry a cash award of €10,000 (approximately US$14,000) each.

Bartels's research is in the field of geometric and algebraic topology and focuses primarily on the so-called Farrell Jones Conjecture and related problems. This conjecture is important to understanding the topology of manifolds. Görtz works in the field of arithmetic algebraic geometry. He is particularly interested in algebraic geometric problems that originate from the Langlands program or the theory of Shimura varieties. This also involves relations to numerous other areas in mathematics—for instance, to algebraic geometry and number theory, and in particular to representation theory.

The von Kaven prize is funded from the proceeds of the von Kaven Foundation, which was established in December 2004 by mathematician Herbert von Kaven.

—From a DFG announcement

Alur and Dill Receive Computer-Aided Verification Award

RAJEEV ALUR of the University of Pennsylvania and DAVID L. DILL of Stanford University have been awarded the 2008 Computer-Aided Verification (CAV) Award for fundamental contributions to the theory of real-time systems verification. This is the first year of this annual award.

The researchers were honored for their joint 1990 article, "Automata for modeling real-time systems". This article laid the theoretical foundation for the computer-aided verification of real-time systems, which are computer systems that are expected to finish their computations by specific deadlines. With the increasing ubiquity of embedded computers, which control everything from aircraft to medical devices, there is an urgent need for a rigorous methodology that can ensure that such systems operate without failures.

During the late 1980s there were several attempts to extend the theory of computer-aided verification to real-time systems. Alur and Dill's work put this research direction on a firm foundational footing. In particular, the formalism of timed automata that they introduced in the prize-winning article has become the standard model for the verification of real-time systems. This article is among the most cited in the field of computer-aided verification.

Rajeev Alur is the Zisman Family Professor in the Department of Computer and Information Science at the University of Pennsylvania. He obtained his bachelor's degree in computer science from the Indian Institute of Technology at Kanpur in 1987 and his Ph.D. in computer science from Stanford University in 1991. Before joining the University of Pennsylvania in 1997, he was with the Computing Science Research Center at Bell Laboratories. Alur's research spans formal modeling and analysis of reactive systems, hybrid systems, model checking, software verification, and design automation for embedded software. His awards include the President of India's Gold Medal for academic excellence, a CAREER award from the National Science Foundation, and an Alfred P. Sloan Faculty Fellowship. He is a fellow of the Association for Computing Machinery (ACM) and of the Institute of Electrical and Electronics Engineers (IEEE) and recently served as the chair of the ACM's Special Interest Group on Embedded Systems (SIGBED).

David L. Dill is a professor of computer science and, by courtesy, of electrical engineering at Stanford University, where he has been on the faculty since 1987. He has an S.B. in electrical engineering and computer science from the Massachusetts Institute of Technology (1979) and a Ph.D. from Carnegie-Mellon University (1987). His research interests cover a variety of areas, including computational systems biology, the theory and application of formal verification techniques to system designs, and voting technology. He has also done research in asynchronous circuit verification and synthesis and in verification methods for hard real-time systems. He was one of the founders and the chief scientist of 0-In Design Automation (later acquired by Mentor Graphics) and the founder of the nonprofit organizations Verified Voting Foundation and VerifiedVoting.org. His awards include the ACM's Distinguished Dissertation award for his Ph.D. thesis, a Presidential Young Investigator Award from the National Science Foundation, a Young Investigator Award from the Office of Naval Research, and the Electronic Frontier Foundation's Pioneer Award (for work in electronic voting). He is a fellow of the IEEE and ACM.

The CAV Award is given annually for a specific fundamental contribution or a series of outstanding contributions to the field of computer-aided verification. CAV is the subdiscipline of computer science that is concerned with ensuring that software and hardware systems operate correctly and reliably. The award was established by the steering committee of the annual CAV conference and carries a cash prize of US$10,000. The first presentation was made at the annual CAV conference on July 10, 2008, in Princeton, New Jersey.

—Aarti Gupta, CAV Committee

MAA Awards

The Mathematical Association of America (MAA) presented several awards for excellence in expository writing and teaching at its Summer Mathfest in Madison, Wisconsin, July 31–August 2, 2008.

The Carl B. Allendoerfer Award is given for articles published in *Mathematics Magazine* and has a cash prize of US$500. The 2008 awardees are EUGENE BOMAN, Pennsylvania State University, RICHARD BRAZIER, Pennsylvania State University, and DEREK SEIPLE, University of Arizona, for their joint article "Mom! There's an asteroid in my closet!", *Mathematics Magazine*, April 2007; and CHRIS CHRISTENSEN, Northern Kentucky University, for the

article "Polish mathematicians finding patterns in enigma messages", *Mathematics Magazine*, October 2007.

The Trevor Evans Award is given to authors of expository articles that are accessible to undergraduates and that were published in *Math Horizons*. The prize carries a cash award of US$250. The awardees for 2008 are WILLIAM DUNHAM, Muhlenberg College, for his article "Euler's amicable numbers", *Math Horizons*, November 2007; and ROBERT K. MONIOT, Fordham University, for his article "The taxman game", *Math Horizons*, February 2007.

The Lester R. Ford Award is given for articles published in the *American Mathematical Monthly* and has a cash award of US$500. The following authors were honored for 2008: TOM M. APOSTOL and MAMIKON A. MNATSAKANIAN, both of the California Institute of Technology, for their joint article "Unwrapping curves from cylinders and cones", *American Mathematical Monthly*, May 2007; DAVID AUCKLY, Kansas State University, for "Solving the quartic with a pencil", *Monthly*, January 2007; ANDREW COHEN, University of Massachusetts, and TANYA LEISE, Amherst College, for their joint article "Nonlinear oscillators at our fingertips", *Monthly,* January 2007; THOMAS C. HALES, University of Pittsburgh, for "The Jordan curve theorem, formally and informally", *Monthly*, December 2007; and KATHERINE SOCHA, St. Mary's College of Maryland, for "Circles in circles: Creating a mathematical model of surface water waves", *Monthly*, March 2007.

The George Pólya Award is given for articles published in the *College Mathematics Journal.* It carries a cash award of US$500. The 2008 honorees are ROLAND MINTON, Roanoke College, and TIMOTHY J. PENNINGS, Hope College, for their joint article "Do dogs know bifurcations?", *College Mathematics Journal*, November 2007; and ANDREW J. SIMOSON, King College, Bristol, Tennessee, for "Pursuit curves for the man in the moone," *College Mathematics Journal*, November 2007.

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 for at most ten years. The awardee receives a cash prize of US$500. MARILYN CARLSON of Arizona State University has been selected to receive the 2008 prize.

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 had influence beyond their own classrooms. The prize carries a cash award of US$1,000. The prizes for 2008 were awarded to DAVID BROWN of Ithaca College; JACQUELINE A. JENSEN of Sam Houston State University; and KATHERINE SOCHA of St. Mary's College of Maryland.

—From an MAA announcement

Petrosyan Awarded Emil Artin Junior Prize

NANSEN PETROSYAN of the Catholic University of Leuven, Belgium, has been awarded the 2008 Emil Artin Junior Prize in Mathematics. Petrosyan was chosen for his paper "Jumps in cohomology and free group actions", published in the *Journal of Pure and Applied Algebra* **210** (2007), 695–703.

Established in 2001, the Emil Artin Junior Prize in Mathematics carries a cash award of US$1,000 and is presented usually every year to a student or former student of an Armenian university, who is under the age of thirty-five, for outstanding contributions to algebra, geometry, topology, and number theory—the fields in which Emil Artin made major contributions. The prize committee consisted of A. Basmajian, Y. Movsisyan, and V. Pambuccian.

—Artin Prize Committee announcement

Pi Mu Epsilon Student Paper Presentation Awards

Pi Mu Epsilon (PME), the U.S. honorary mathematics society, makes annual awards to recognize the best papers by undergraduate students presented at a PME student paper session. This year PME held a session in conjunction with the Mathematical Association of America MathFest in Madison, Wisconsin, July 30–August 2, 2008. Eight students were designated as 2008 AMS Award Winning Pi Mu Epsilon Student Speakers, each of whom received a check for US$150. Their names, institutions, and paper titles follow.

SAMUEL BEHREND, Ohio Iota Chapter at Denison University, "Determining intrinsic trip linking in straight-edge embeddings of K_9"; ALICIA BRINKMAN, Wisconsin Delta Chapter at Saint Norbert College, "How we roll: The theory and construction of the square wheel bicycle"; IORDAN GANEV, Ohio Delta Chapter at Miami University, "Order dimension of subgroups"; BRENDAN KELLY, New Jersey Chapter at the College of New Jersey, "How to obtain algebraic information from zero-divisor graphs"; DANIEL LITHIO, Michigan Delta Chapter at Hope College, "Modeling dynamics of a volleyball serve: Choosing the optimal trajectory"; W. RYAN LIVINGSTON, Ohio Xi Chapter at Youngstown State University, "Can 2008 be the first digits of 2^n?"; JARED RUIZ, Ohio Xi Chapter at Youngstown State University, "A surprising sum of arctangents"; and JEREMY THOMPSON, Colorado Gamma Chapter at the United States Air Force Academy, "Numerical semigroups and Wilf's Conjecture".

—From a Pi Mu Epsilon announcement

B. H. Neumann Awards Given

The Board of the Australian Mathematics Trust has named the winners of the B. H. Neumann Awards for 2008. PHILIP SWEDOSH of St. Leonard's College has been a Victorian Certificate of Education (VCE) mathematics examiner and has served on the setting panel for specialist mathematics since 1997. He was also a group leader for the combined Department of Education and Municipal Association of Victoria (MAV) camp, which he directed from 2000 to 2002. He has been a moderator for the Mathematics Challenge for Young Australians since 1993 and Victorian Director of the Australian Mathematics Olympiad Committee since 1998. He was also a member of the organizing committee for the Melbourne Conference of the World Federation of National Mathematics Competitions in 2002.

BEN BURTON has been a tutor at the National Mathematics Summer School and also at the Australian Mathematical Olympiad training camps. He also trained a team of undergraduates at the University of Melbourne for the Association of Computing Machinery (ACM) computer programming competition. He was the inaugural and is still director of training for International Olympiad in Informatics (IOI).

STEVE THORNTON of the University of Canberra has served more than ten years as a member of the Mathematics Challenge for Young Australians Problems Committee. He has served various terms as president and secretary of the Australian Association of Mathematics Teachers and also held various offices with the Mathematics Association of South Australia and the Canberra Mathematics Association. He developed the Australian Mathematics Teacher Enrichment Program, which enabled qualified mathematics teachers to help students who wished to pursue further mathematics study.

The awards, named for Bernhard H. Neumann, are presented each year to mathematicians who have made important contributions over many years to the enrichment of mathematics learning in Australia and its region.

—*From a Board of Mathematics Trust announcement*

Royal Society of Canada Elections

The following mathematical scientists have been elected to the Royal Society of Canada: IVAR EKELAND, Pacific Institute for the Mathematical Sciences, University of British Columbia; PENGFEI GUAN, McGill University; RAYMOND LAFLAMME, Institute for Quantum Computing, University of Waterloo; and ECKHARD MEINRENKEN, University of Toronto. Chosen as a Specially Elected Fellow was AGNES M. HERZBERG, Queen's University.

—*From a Royal Society of Canada announcement*