Mathematics People

Prizes of the Mathematical Society of Japan

The Mathematical Society of Japan (MSJ) has awarded several prizes for 2009. NARUTAKA OZAWA of the University of Tokyo has been awarded the 2009 Spring Prize for his outstanding contributions to discrete group and operator algebra. The Spring Prize is awarded to a mathematician less than forty years of age who has made outstanding contributions to mathematics.

KEIJI OGUISO of Keio University and AKIHIKO YUKIE of Tohoku University have been awarded Algebra Prizes. Oguiso was honored for his contributions to the theory of generalized Calabi-Yau manifolds, and Yukie was chosen for his contributions to the theory of prehomogeneous vector spaces.

The Publication Prize is given for distinguished contributions to the mathematical literature. MASAHITO TAKASE of Kyushu University was honored for his translations of important classic books, including those of Euler, Gauss, and Legendre, and for his writings on mathematics. Two book series were awarded prizes. The Joy of Mathematical Sciences series, by the Hayakawa Shobou Publishing Company, helped to popularize mathematics by publishing many new as well as older mathematics books in the genre of popular science in a reader-friendly manner. The Chikuma Library on Arts and Sciences, Math and Science, by the Chikuma Shobou Publishing Company, helped to popularize more serious mathematical sciences through the publication of many good books on the motives and philosophy behind the development of mathematical sciences.

—From a Mathematical Society of Japan announcement

Computer-Aided Verification Prize Awarded

The 2009 Computer-Aided Verification (CAV) award has been presented to the following seven individuals: CONOR F. MADIGAN, Kateeva, Inc.; SHARAD MALIK, Princeton University; JOAO P. MARQUES-SILVA, University College Dublin, Ireland; MATTHEW W. MOSKEWICZ, University of California Berkeley; KAREM A. SAKALLAH, University of Michigan; LINTAO ZHANG, Microsoft Research, and YING ZHAO, Wuxi Capital Group. They were honored for fundamental contributions to the development of high-performance Boolean satisfiability solvers.

The award recipients worked in two different teams, one at the University of Michigan and one at Princeton University, where they created powerful programs for checking whether a logic formula has a consistent solution. This is known as a "Boolean satisfiability problem". Satisfiability, or SAT, solvers can be used to solve a number of different problems, and it must be determined whether there is any way of satisfying all of them. SAT solvers have had a profound impact on the field of computer-aided verification, which is dedicated to the creation of tools that allow hardware and software designers to detect possible flaws in their systems and programs. Sakallah and Marques-Silva's GRASP solver, developed at the University of Michigan, started with a classic algorithm devised by Davis, Putnam, Logemann, and Loveland and denoted by DPLL in 1962. DPLL applies a backtracking search to enumerate different assignments to the variables of a formula until either a solution is found or the set of possible solutions is exhausted. Sakallah and Marques-Silva modified the DPLL algorithm to more effectively detect large classes of assignments that cannot possibly yield satisfying solutions. In doing so, they shifted the core strategy of SAT solvers from one of searching for a solution to one of pruning away the unsatisfying assignments. This change in strategy was critical to the successful application of GRASP to verification problems, where formulas typically have very few, if any, satisfying solutions (because such solutions signify errors in the system being verified). They also changed the method of measuring SAT solver performance away from solving randomly generated problems to solving benchmark problems arising from real-world examples. This shift favors tuning SAT solvers to take advantage of structures and characteristics found in actual systems.

With his students Moskewicz, Madigan, Zhao, and Zhang, Malik developed the Chaff solver, which was built on the ideas of GRASP but also introduced a more careful

engineering-based approach to solver design. They identified memory performance as a critical bottleneck in DPLL SAT solvers and devised clever data structures to reduce the portions of a formula that must be rechecked as the effects of the variable assignments are propagated. Chaff was able to handle SAT problems of far greater size than anyone had imagined possible. Many research projects and many industrial verification tools have been devised with SAT solvers at their core. The impact of GRASP and Chaff on the CAV community has been profound.

Sharad Malik is the George Van Ness Lothrop Professor of Engineering at Princeton. He received his Ph.D. in computer science from the University of California, Berkeley, in 1990 and joined the Princeton faculty in 1991. Awards he has received include a National Science Foundation Young Investigator Award (1994), an Institute of Electrical and Electronics Engineers (IEEE) Fellowship (2002), a Best Paper Award from the IEEE/ACM Design Automation and Test in Europe (DATE) (2003), IBM Faculty Awards (2006 and 2007), and Princeton University's President's Award for Distinguished Teaching (2009).

Joao P. Marques-Silva is the SFI Stokes Professor of Computer Science and Informatics at University College Dublin. He received his Ph.D. from the University of Michigan and a Habilitation in Computer Science from the Technical University of Lisbon. He has held positions at the University of Southampton, United Kingdom, and at IST/Technical University of Lisbon, Portugal. He is a member of the editorial board of the *Journal on Satisfiability, Boolean Modeling and Computation* and associate editor of *Integration: The VLSI Journal.* His research interests include decision and optimization procedures, including Boolean satisfiability and extensions; applied formal methods; applications in system verification and model checking; artificial intelligence; design automation; and bioinformatics.

Karem Sakallah is a professor of electrical engineering and computer science at the University of Michigan. He received his Ph.D. from Carnegie Mellon University in 1981. Before joining the University of Michigan faculty in 1988, he was employed at Digital Equipment Corporation, where he headed the Analysis and Simulation Advanced Development Team. He is associate editor of the *IEEE Transactions on Computers.* His research interests include computer-aided design with emphasis on logic and layout synthesis, Boolean satisfiability, discrete optimization, and hardware and software verification.

The CAV Award is given annually for a specific fundamental contribution or 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 in 2008 by the steering committee of the annual CAV conference. It includes a cash prize of US$10,000. The presentation was made at the CAV conference held in Grenoble, France, June 26–July 2, 2009.

—Randy Bryant, Carnegie-Mellon University

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 Portland, Oregon, August 5–8, 2009. The AMS and the American Statistical Association sponsor awards to student speakers for excellence in exposition and research. Each awardee received a check for US$150. The names, chapters, institutions, and paper titles of the award-winning students follow.

MATT ALEXANDER, Ohio Xi Chapter at Youngstown State University, "Application of the Riemann zeta function"; NEIL BIEGALLE, Michigan Iota Chapter at Grand Valley State University, "The extremality of Bernstein polynomials"; ADAM BOSEMAN, North Carolina Epsilon Chapter at the University of North Carolina at Greensboro, "Zeros of Riemann's zeta function"; LISA CURLL, Ohio Iota Chapter at Youngstown State University, "Bacterial resistance: When selenite is your kryptonite"; THOMAS ELIOT, Oregon Zeta Chapter at Willamette University, "Negative voting"; HAROLD L. GOMES, New York Alpha Chapter at the City University of New York, Queens College, "The brain and mathematical modeling"; MASAKI IKEDA, Oregon Zeta Chapter at Western Oregon University, "Random juggling"; JENNIFER JORDAN, Maryland Theta Chapter at Goucher College, "Follow the food feeding function"; JASON LUTZ, Minnesota Delta Chapter at St. John's University, "An analog for a basis in finite groups"; SEAN WATSON, Texas Pi Chapter at Southwestern University, "Series in Banach spaces"; MORIAH WRIGHT, Ohio Xi Chapter at Youngstown State University, "Mathematically modeling cardiac myocytes".

—From a Pi Mu Epsilon announcement

NDSEG Fellowships Awarded

Sixteen young mathematicians have been awarded National Defense Science and Engineering Graduate (NDSEG) Fellowships by the Department of Defense (DoD). As a means of increasing the number of U.S. citizens trained in disciplines of military importance in science and engineering, DoD awards fellowships to individuals who have demonstrated ability and special aptitude for advanced training in science and engineering. The fellowships are sponsored by the United States Army, Navy, and Air Force.

The following are the names of the fellows in mathematics, their institutions, and the offices that awarded the fellowships: JOSHUA BATSON, Army Research Office (ARO); DORIS DOBI, Massachusetts Institute of Technology, Office of Naval Research (ONR); DMITRIY DRUSVYATSKIY, Cornell University, Air Force Office of Scientific Research (AFOSR); CHRISTOPHER DUBOIS, University of California Irvine, ONR; ADAM ELMACHTOUB, Massachusetts Institute of

Technology, AFOSR; NICHOLAS HABER, Stanford University, ARO; RUSSELL HOWES, University of California Los Angeles, ONR; JOHN KOLINSKI, Harvard University, ONR; KATHRYN LINDSEY, Cornell University, ARO; PO-LING LOH, University of California Berkeley, ARO; AARON PIXTON, Princeton University, ARO; STEVEN SAM, Massachusetts Institute of Technology, ONR; STANLEY SNELSON, Courant Institute of Mathematical Sciences, New York University, AFOSR; ELY SPEARS, Brown University, AFOSR; KERRY STEVENS, Columbia University, AFOSR; VLADISLAV VORONINSKI, University of California Berkeley, AFOSR.

—From an NDSEG announcement

2009 Clay Liftoff Fellows Chosen

The Clay Mathematics Institute (CMI) has selected seven young mathematicians as Clay Liftoff Fellows for 2009. The Liftoff Fellows program provides one month of summer employment to new Ph.Ds to allow them to carry out mathematics research prior to starting a faculty or postdoctoral position. The fellows for 2009 are: DAVID ANDERSON, University of Michigan; JONAH BLASIAK, University of California Berkeley; VICTOR LIE, University of California Los Angeles; GRIGOR SARGSYAN, University of California Berkeley; ANDREW SNOWDEN, Princeton University; MELANIE MATCHETT WOOD, Princeton University; and XINWEN ZHU, University of California Berkeley.

—From a CMI announcement

B. H. Neumann Awards Given

The Board of the Australian Mathematics Trust has named the winners of the B. H. Neumann Awards for 2009. KATRINA SIMS of Canberra holds a master's degree in gifted education and established a gifted and talented program at a Canberra primary school. She won a National Teaching Award in 1999 and joined the Problems Committee of the Mathematics Challenge for Young Australians, specializing in problems for the younger age groups. She has involved students in codes and ciphers and has been at the forefront of using computers in the classroom; her students won a national webpage competition. She also taught herself animation skills and completed a diploma in multimedia. She has also established chess clubs and taught a robotics program. She is now teaching in a middle school, running special programs for students up to year 10.

ELENA STOYANOVA works for the Western Australian Department of Education. While a resident of Bulgaria, she was deputy leader of the Bulgarian International Mathematical Olympiad (IMO) team that participated in the IMO in Canberra in 1988. She designed and conducted mathematics enrichment programs with mathematically able students in years 5, 6, and 7. She initiated and drove the development of the annual Western Australian Junior Mathematics Olympiad, now in its tenth year.

LATCHEZAR (NEDELTCHEV) STOYANOV is a professor of mathematics at the University of Western Australia. He was instrumental in training the Bulgarian national team before moving to Australia. He and his wife, Elena Stoyanova, founded the University of Western Australia Academy for Young Mathematicians, an enrichment program for students in years 10 and 11, in 1995. Together they ran the Western Australia Mathematics Training Seminars, an intensive training session for a group of ten to fifteen high school students taking part in the IMO training. Stoyanov has served on the Problems Committee for the Western Australian Junior Mathematics Olympiad each year since its inception, and for many years he played a key role in its detailed organization.

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

Invited Speakers for ICM 2010, Hyderabad

A number of speakers have been invited to deliver lectures at the International Congress of Mathematicians (ICM) in Hyderabad, India, August 19–27, 2010. Current information about the 2010 ICM is available at `http://www.icm2010.org.in/`.

S. R. SRINIVASA VARADHAN of the Courant Institute of Mathematical Sciences, New York University, will deliver the Abel Lecture, sponsored by the Norwegian Academy of Sciences. IDUN REITEN of the Norwegian University of Science and Technology will deliver the Emmy Noether Lecture.

The following individuals will deliver plenary lectures: DAVID ALDOUS, University of California Berkeley; ARTUR AVILA, Université Pierre et Marie Curie and Instituto Nacional de Matemática Pura e Aplicada (IMPA), Brazil; R. BALASUBRAMANIAN, Institute of Mathematical Science, Madras; JEAN-MICHEL CORON, Université Pierre et Marie Curie; IRIT DINUR, Weizmann Institute of Science; HILLEL FURSTENBERG, Israel; THOMAS J. R. HUGHES, University of Texas at Austin; PETER JONES, Marquette University; CARLOS KENIG, University of Chicago; NGO BAO CHAU, Institute for Advanced Study, Princeton; STANLEY OSHER, University of California Los Angeles; R. PARIMALA, Emory University; A. N. PARSHIN, Russia; SHIGE PENG, Shandong University; KIM PLOFKER, Union College; NICOLAI RESHETIKHIN, University of California Berkeley; RICHARD SCHOEN, Stanford University; CLIFFORD TAUBES, Harvard University; CLAIRE VOISIN, Institut de Mathématiques de Jussieu; HUGH WOODIN, University of California Berkeley.

—Elaine Kehoe