Mathematics People

Reed Awarded 2013 CRM-Fields-PIMS Prize

BRUCE REED of McGill University has been awarded the CRM-Fields-PIMS Prize for 2013 "for his profound contributions to difficult and important problems in the areas of graph minors, graph colouring, algorithmic graph theory, random graphs, and the probabilistic analysis of algorithms." He has made contributions in such areas as discrete mathematics and theoretical computer science and is best known for his work on a broad range of areas within graph theory, with many of his most important contributions being in random structures, graph minors, and graph coloring.

The CRM-Fields-PIMS Prize recognizes exceptional achievement in the area of mathematical sciences. It is awarded by the Centre de Recherches Mathématiques (CRM), the Fields Institute, and the Pacific Institute for Mathematical Sciences (PIMS).

—From a CRM announcement

Bhargava Awarded Infosys Prize

MANJUL BHARGAVA of Princeton University has been awarded the 2012 Infosys Prize for Mathematical Sciences "for his extraordinarily original work in algebraic number theory. His work has revolutionized the way in which various fundamental arithmetic objects, such as number fields and elliptic curves, are understood." The prize citation reads: "Professor Bhargava has made several highly original contributions to algebraic number theory. He has introduced brilliant new ideas which have turned a subject that had been largely stuck for forty years into one of the most active areas in number theory today. He has also proved a series of beautiful theorems that greatly enhance our understanding of number fields and algebraic curves, two of the most studied topics in number theory. In particular, he showed how to count quartic and quintic number fields and proved that the average rank of elliptic curves over the rational numbers is less than 1." The award is given annually to honor outstanding achievements of contemporary researchers and scientists across six categories: engineering and computer sciences, humanities, life sciences, mathematical sciences, physical sciences, and social sciences. It carries a cash award of US$90,000.

—From an Infosys Science Foundation announcement

Leverhulme Prizes Awarded

Five mathematicians have been awarded Leverhulme Prizes by the Leverhulme Trust. They are TOBY GEE, Imperial College London, number theory; JONATHAN MARCHINI, University of Oxford, statistical genetics; ANDRE NEVES, Imperial College London, geometric analysis; CHRISTOPH ORTNER, University of Warwick, numerical analysis and applied analysis; and LASSE REMPE-GILLEN, University of Liverpool, complex dynamics. The Leverhulme Prizes carry a cash award of £70,000 (approximately US$112,800) each and are awarded to outstanding scholars who have made a substantial and internationally recognized contribution to their particular field of study and who are expected to achieve greater things in the future. The prizes commemorate the contribution to the work of the trust made by Philip Leverhulme, the Third Viscount Leverhulme and grandson of the founder.

—From a Leverhulme Trust announcement

Matui Awarded Operator Algebra Prize

HIROKI MATUI of Chiba University has been awarded the fourth Operator Algebra Prize for his outstanding contributions to the interaction between topological dynamical systems and C*-algebras and classification of group actions on C-algebras. The prize consists of a cash award of about US$4,000, a prize certificate, and a medal. The Operator Algebra Prize was established in 1999 by initiatives and contributions from some senior Japanese researchers in operator algebra theory and related fields to encourage young researchers in these fields. The prize is awarded every four years to a person under forty years of age either of Japanese nationality or principally based in a Japanese institution for outstanding contributions to operator algebra theory and related areas.

—Yasuyuki Kawahigashi, Chair,
Operator Algebra Prize Committee

Prizes of the Mathematical Society of Japan

The Mathematical Society of Japan (MSJ) has announced a number of prizes for 2012.

The Analysis Prize is awarded to researchers who have contributed to the progress of analysis in a broad sense by obtaining outstanding results. The 2012 Analysis Prize has been awarded to YOSHIYUKI KAGEI of Kyushu University for work on stability analysis for parallel flow of the compressible viscous fluid, to SHIGERU SAKAGUCHI of Tohoku University for work on geometry on the domain via the isothermic set for diffusion equations, and to MASANOBU TANIGUCHI of Waseda University for studies on optimal statistical inference in time series analysis.

The Geometry Prize is awarded to researchers who have contributed to the development of geometry in a broad sense by obtaining outstanding results. The 2012 Geometry Prize has been awarded to KEN'ICHI OSHIKA of Osaka University for the affirmative solution of the Bers-Sullivan-Thurston density conjecture and to YUKINOBU TODA of the University of Tokyo for the study of the Donaldson-Thomas invariants by stability conditions in derived categories.

The Autumn Prize for 2012 has been awarded to MITSUHIRO NAKAO of Sasebo National College of Technology for outstanding contributions to research on validated computation and its applications to partial differential equations. The Autumn Prize is awarded without age restriction to people who have made exceptional contributions in their fields of research.

The Fujiwara Award was given to KENJI FUKAYA of Kyoto University for outstanding contributions to mathematical foundation and geometric realization of topological field theory.

—From MSJ announcements

Isidori Receives 2012 IEEE Control Systems Award

ALBERTO ISIDORI of Sapienza University, Rome, Italy, has been named the recipient of the 2012 Control Systems Award of the Institute of Electrical and Electronics Engineers (IEEE) for his groundbreaking work in nonlinear control. According to the prize citation, his "research in the early 1970s focused on systems realization, resulting in the first complete theory of minimal realization for a class of nonlinear systems. He then extended the geometric theory used for feedback design in multivariable linear systems to general classes of nonlinear systems. This work is considered a milestone in the study of nonlinear feedback systems. Dr. Isidori also developed the concept of nonlinear zero dynamics, which has had fundamental impact on designing feedback laws for nonlinear systems. His contributions to regulation and tracking in nonlinear systems resulted in the design of a feedback law that solves the nonlinear equivalent of the servomechanism problem in linear control."

—From an IEEE announcement

Hendy Awarded Shorland Medal

MICHAEL HENDY of Otago University has been awarded the Shorland Medal of the New Zealand Association of Scientists for "an outstanding body of research into mathematical phylogeny—the set of mathematical tools for reconstructing evolutionary relationships between species using DNA sequences," according to the prize citation. The award recognizes major and continued contribution to basic or applied research that has added significantly to scientific understanding or produced significant benefits to society.

—From a New Zealand Association of Scientists announcement

AAAS Fellows 2012

Seven researchers have been elected fellows of the Section on Mathematics of the American Association for the Advancement of Science (AAAS). They are: SUSANNE C. BRENNER, Louisiana State University; ROBERT CALDERBANK, Duke University; L. PAMELA COOK-IOANNIDIS, University of Delaware; SUSAN FRIEDLANDER, University of Southern California; CAROLYN GORDON, Dartmouth College; DEBORAH FRANK LOCKHART, National Science Foundation; and SUSAN MONTGOMERY, University of Southern California.

—From an AAAS announcement

2012 Siemens Competition

Several high school students whose work involves the mathematical sciences have won prizes in the 2012 Siemens Competition in Math, Science, and Technology.

KENSEN SHI of A&M Consolidated High School, College Station, Texas, won a scholarship worth US$100,000 for his computer science project "Lazy Toggle PRM: A Single-Query Approach to Motion Planning". He was mentored by Nancy Amato of Texas A&M University, who invited him to join her laboratory focusing on the motion-planning problem, which involves finding a safe path for a moveable object among obstacles, such as an assembly-line robot in a factory. Shi developed a new algorithm that could compute safe paths for virtually any type of robot more efficiently than other methods. The strategy, called Lazy Toggle PRM, is effective in a wide range of scenarios, including those with narrow passages and highly complex environments. Shi has won honors in a variety of mathematics and science competitions. As Texas American

Regional Mathematics League Gold Team captain, he led his team to thirteenth place nationally. A senior, he is captain of his school's Science Bowl team, which placed second regionally for two consecutive years. As president of the Math Club, he presented a series of seminars on advanced topics and qualified for the USA Junior Mathematical Olympiad.

JIAYI PENG of Horace Greeley High School, Chappaqua, New York, was awarded a US$50,000 scholarship for her physics project "A Cellular Automation Model for Critical Dynamics in Neuronal Networks". She was mentored by John M. Beggs of Indiana University. Peng said, "I like how interdisciplinary mathematical modeling can be. Its basis may be in mathematics and/or physics, yet it can be used to solve real-world problems." Peng built a cellular automation model that combined short-term synaptic plasticity with long-term metaplasticity to investigate how these two mechanisms contribute to attaining and maintaining operation at a critical point. Her research could help determine how distinct neurological mechanisms can differentiate a healthy brain from one with a devastating neurological disorder such as epilepsy, autism, or Alzheimer's disease. Peng became interested in mathematical modeling after reading an article in *Scientific American* about mathematicians and computer scientists modeling terrorist group structures and predicting their behavior. A senior, she is a member of the Cum Laude Honor Society and is her school's top scorer in the American Mathematics Competition. She is a National Merit Semifinalist and has received Moody's Math Challenge National Honorable Mention. She plans to major in physics or mathematics and aspires to be a researcher or professor in one of these fields.

The team of DANIEL FU of Park Tudor School, Indianapolis, Indiana, and PATRICK TAN, Carmel High School, Carmel, Indiana, was awarded a US$50,000 scholarship for their mathematics project "Chaos and Robustness in a Single Family of Genetic Oscillatory Networks". They were mentored by Alexey Kuznetsov and Yaroslav Molkov of Indiana University-Purdue University Indianapolis. In their project, Fu and Tan researched new techniques for mathematically analyzing genetic oscillatory networks. They developed a method for reducing infinitely dimensional delay differential equations (DDEs) to three-dimensional systems of ordinary differential equations (ODEs). Their work could lead to better treatments of diseases with irregularities in the cell cycle, such as cancer, or the circadian rhythm, such as sleep disorders. Fu, a junior, is a member of the USA Computing Olympiad Silver Division and won fourth place in the American Chemistry Society exam, Indiana section. He volunteers in cancer clinics and mentors other students in STEM. He is considering a major in computer science or political science and hopes to be either a research professor or a politician. In the near future, he is most excited about attending The Hague International Model United Nations in the Netherlands. Tan, a junior, is secretary of the Key Club, president of the Chemistry Club, and a member of the Top Symphonic Band. He cofounded the DPY Math Contest for middle school students, which helps prepare them for the MATHCOUNTS competition. He plans to study biochemistry, applied mathematics, and finance in college and aspires to a career in which he can combine math and science with his desire to help people.

The team of JONATHAN TIDOR and ROHIL PRASAD of Lexington High School, Lexington, Massachusetts, was awarded a US$20,000 scholarship for their mathematics project "New Results in Staged Self-Assembly of Wang Tiles". They were mentored by Jesse Geneson of the Massachusetts Institute of Technology. Tidor and Prasad said, "We decided on this research topic not only because of the interesting math involved but also because of its potential to be used beneficially in the real world." Their mathematics research explores self-assembly, which deals with the spontaneous appearance of order out of simple parts and is often applied in the field of nanotechnology. They looked at a self-assembly model and developed a method to build arbitrary shapes that is optimal in most situations. They found faster ways to create systems of particles that assemble themselves into particular structures, which could make it easier to assemble a large variety of nanostructures, such as nanoscale biomedical devices. They are looking forward to the possibility of their research being published in the next few months. Tidor, a junior, is captain of his school's math team and Science Bowl team, which was a winner at the national Science Bowl. He expects to pursue a career related to mathematics or physics. Prasad, also a junior, aspires to work in a mathematics-related field. "I enjoy the intense problem-solving aspects of it, in addition to how beautiful many things are in mathematics," he said. He is a member of the Science Bowl team and volunteers with his middle school's math team.

—From a Siemens Competition announcement