Mathematics People

Bayer and Coates Awarded Adams Prize

AREND BAYER of the University of Edinburgh and THOMAS COATES of Imperial College London have been jointly awarded the 2015 Adams Prize, given this year in the field of algebraic geometry.

According to Raymond Goldstein, chairman of the Adams Prize Adjudicators, "Arend Bayer has made outstanding contributions to spaces of stability conditions on derived categories. His work has novel applications in key areas of modern algebraic geometry, including spaces of Bridgeland stability conditions on derived categories of Calabi-Yau threefolds, wall-crossing and the minimal model program in the birational geometry of moduli spaces. Tom Coates's work answers many fundamental questions in Gromov-Witten theory, quantum cohomology, mirror symmetry, and birational geometry. These include the quantum Lefschetz hyperplane section theorem, the Crepant resolution and wall-crossing conjectures, and the modularity of the generating function for Gromov-Witten invariants of Calabi-Yau threefolds."

The Adams Prize is awarded each year jointly by the Faculty of Mathematics at the University of Cambridge and St. John's College to a young researcher or researchers based in the United Kingdom doing first-class international research in the mathematical sciences. The prize is named after the mathematician John Couch Adams and was endowed by members of St. John's College. It is currently worth approximately £15,000 (approximately US$23,000), of which one-third is awarded to the prizewinner on announcement of the prize, one-third is provided to the prizewinner's institution (for research expenses of the prizewinner), and one-third is awarded to the prizewinner on acceptance for publication in an internationally recognized journal of a substantial (normally at least twenty-five printed pages) original survey article of which the prizewinner is an author.

—From a University of Cambridge announcement

Kritzer Awarded 2015 IBC Prize

PETER KRITZER of the University of Linz, Austria, has been named the recipient of the 2015 Information-Based Complexity (IBC) Prize. The prize consists of US$3,000 and a plaque to be presented at the Seminar on Algorithms and Complexity for Continuous Problems, Schloss Dagstuhl, Germany, September 2015. This annual prize is given for outstanding contributions to information-based complexity.

—Joseph F. Traub, Columbia University

Prizes of the Math Society of Japan

The Mathematical Society of Japan (MSJ) has awarded several prizes for 2015.

The Spring Prize has been awarded to KENICHI KAWARABAYASHI of the National Institute for Informatics for his outstanding contributions to the study of graph minor theory and its application to computational complexity theory. The Spring Prize is awarded to those under the age of forty who have obtained outstanding mathematical results.

The Algebra Prize has been awarded to SYU KATO of Kyoto University for his geometric studies on quantum groups and Hecke algebras.

The Outstanding Paper Prize is awarded each year to the authors of the most outstanding articles published in the *Journal of the Mathematical Society of Japan* (JMSJ) during the preceding year. For 2015 the awardees were: JOACHIM HILGERT, Universität Paderborn; TOSHIYUKI KOBAYASHI, University of Tokyo; and JAN MÖLLERS, Aarhus University, for their joint paper "Minimal representations via Bessel operators," *Journal of the Mathematical Society of Japan* **66** (2014), no. 2, 349–414; to NGUYEN TIEN ZUNG and NGUYEN VAN MINH, Institut de Mathématiques de Toulouse, for their joint paper "Geometry of nondegenerate $\mathbf{R}^n$-actions on n-manifolds," *Journal of the Mathematical Society of Japan* **66** (2014), no. 3, 839–894; and to HIDE-

HIKO MISHOU, Tokyo Denki University, for the paper "Functions," *Journal of the Mathematical Society of Japan* **66** (2014), no. 4, 1105–1126.

The JSPS Prize of the Japan Society for the Promotion of Science (JSPS) was awarded to TSUYOSHI TAKAGI of Kyushu University of Informatics and YUKINOBU TODA of the University of Tokyo. Takagi was recognized for his contributions to security analysis and efficient implementation of public-key cryptography. Toda was recognized for his contributions to derived category of coherent sheaves and counting invariants.

The Inoue Prize for Science was awarded to MASAKI IZUMI of Kyoto University for his contributions to the theory of operator algebras.

—From MSJ announcements

Kleinberg Receives Newell Award

JON KLEINBERG of Cornell University has been awarded the 2014 Allen Newell Award of the Association for Computing Machinery (ACM) and the Association for the Advancement of Artificial Intelligence (AAAI) "for groundbreaking work in computer science on social and information networks, information retrieval, and data science, and for bridging computing, economics, and the social sciences." According to the prize citation, Kleinberg "contributed to the development of link analysis, a search technique that ranks the absolute number as well as the most relevant, trusted sources of pages linked to a Web search query. His innovative models and algorithms have broadened the scope of computer science to extend its influence to the burgeoning world of the Web and the social connections it enables." The prize carries a cash award of US$10,000.

—From an ACM announcement

AWM Essay Contest Winners Announced

The Association for Women in Mathematics (AWM) has announced the winners of its 2015 essay contest, "Biographies of Contemporary Women in Mathematics." The grand prize was awarded to MAKAYLA GATES, Valencia Middle School, Peralta, New Mexico, for her essay "Oasis in the Desert," about Mrs. Gretta Aguilar of Valencia Middle School. The essay also won first place in the middle school category and will be published in the *AWM Newsletter*. First place in the undergraduate category was awarded to RAMITA KONDEPUDI, Harvey Mudd College, for her essay "Painting with the President: Maria Klawe—Mathematician, Artist, and Educator." First place in the high school category was awarded to KINA SEKITO, Troy High School, Troy, Ohio, for her essay "If the Parameters Change," about Dr. Irina Kogan of North Carolina State University.

—From an AWM announcement

USA Mathematical Olympiad

The 2015 USA Mathematical Olympiad (USAMO) was held April 28–29, 2015. The students who participated in the Olympiad were selected on the basis of their performances on the American High School and American Invitational Mathematics Examinations. The twelve highest scorers in this year's AMO, listed in alphabetical order, were: RYAN ALWEISS, Bergen County Academies, Hackensack, New Jersey; KRITKORN KARNTIKOON, Loomis Chaffee School, Windsor, Connecticut; MICHAEL KURAL, Greenwich High School, Greenwich, Connecticut; CELINE LIANG, Saratoga High School, Saratoga, California; ALLEN LIU, Penfield Senior High School, Penfield, New York; YANG LIU, Ladue Horton Watkins High School, St. Louis, Missouri; SHYAM NARAYANAN, Blue Valley West High School, Overland Park, Kansas; KEVIN REN, Torrey Pines High School, San Diego, California; ZHUOQUN SONG, Phillips Exeter Academy, Exeter, New Hampshire; DAVID STONER, South Aiken High School, Aiken, South Carolina; KEVIN SUN, Phillips Exeter Academy, Exeter, New Hampshire; and DANIELLE WANG, Stanford Math Circle/Stanford University, Stanford, California.

The twelve USAMO winners will attend the Mathematical Olympiad Summer Program (MOSP) at the University of Nebraska, Lincoln, in June 2015. Ten of the twelve will take the team selection test to qualify for the US team. The six students with the highest combined scores from the test and the USAMO will become members of the US team and will compete in the International Mathematical Olympiad (IMO) to be held in Thailand in July 2015.

—From Mathematical Association of America announcements

Moody's Mega Math Challenge

The winners of the 2015 Mega Math Challenge for high school students have been announced. The topic for this year focused on the question, "STEM Sells: What Is Higher Education Really Worth?"

A team from the North Carolina School of Science and Mathematics in Durham, North Carolina, was awarded the Summa Cum Laude team prize of US$20,000 in scholarship money. The students were MICHAEL AN, GUY BLANC, EVAN LIANG, SANDEEP SILWAL, and JENNY WANG. Their coach was Daniel Teague.

The Magna Cum Laude Team Prize of US$15,000 in scholarship money was also awarded to a team from North Carolina School of Science and Mathematics. The students were VINAY KSHIRSAGAR, ALEX LI, HOWARD LI, GRAHAM PASH, and KESHAV PATEL, and they were also coached by Daniel Teague.

The Cum Laude Team Prize of US$10,000 in scholarship money was awarded to a team from Elk River High School, Elk River, Minnesota. The students were JORDAN HAACK, PETER JONES, CHASE GAUTHIER, JOE EVANS, and ZACH GLASGOW. Their coach was Curt Michener.

The Meritorious Team Prize of US$7,500 in scholarship money was awarded to a team from Staples High School, Westport, Connecticut. The team members were

Chaihyun Kim, Claudia Landowne, Claire Sampson, Terrie Yang, and Madeline Schemel, and their coach was Kerrigan Warnock.

The Exemplary Team Prize of US$5,000 was awarded to a team from Maggie Walker Governor's School, Richmond, Virginia. The team members were Will Overman, Wilton Wu, Alan Zhang, Pranay Vissa, and Anant Kharkar. They were coached by Dickson Benesh.

The First Honorable Mention Team Prize of US$2,500 was awarded to a team from South County High School, Lorton, Virginia. The team members were Brian King, Trung Nguyen, Alex Coppeans, Peter Wang, and James Wang. Their coach was Daniel Southard.

The Mega Math Challenge invites teams of high school juniors and seniors to solve an open-ended, realistic, challenging modeling problem focused on real-world issues. The top five teams receive awards ranging from US$5,000 to US$20,000 in scholarship money. The competition is sponsored by the Moody's Foundation, a charitable foundation established by Moody's Corporation, and organized by the Society for Industrial and Applied Mathematics (SIAM).

—From a Moody's Foundation/SIAM announcement

NCTM Lifetime Achievement Awards

The National Council of Teachers of Mathematics (NCTM) has chosen three educators to receive Lifetime Achievement Awards for 2015. They are M. Kathleen Heid of Pennsylvania State University, Franklin Demana of Ohio State University, and Bert K. Waits, also of Ohio State University.

According to the prize citations, Heid "has tirelessly worked to improve mathematics education through her research, teaching, and service at the local, state, and national levels. She has been a trailblazer in using technology to support students' mathematics learning, beginning with her early work with graphing technologies to her more recent work with computer algebra systems. Heid's research on a functional approach to the teaching of algebra broke new ground and has significantly altered the way in which algebra is taught today." Demana, "working jointly with Bert Waits, had a profound effect on mathematics instruction on both a national and an international level. He developed specifications for graphic applications, first for personal computers, and then for handheld graphing calculators. In fact, his ideas inspired the introduction of special capabilities of the calculators themselves." Waits was cofounder of T3, Teachers Teaching with Technology, along with Demana. He was the cofounder and director of the Ohio Early College Mathematics Placement Testing Program of the Ohio Board of Regents.

—From an NCTM announcement

National Academy of Sciences Elections

The National Academy of Sciences (NAS) has elected eighty-four new members and twenty-one foreign associates for 2015. Following are the new members whose work involves the mathematical sciences: Alexander Eskin, University of Chicago; Donald Geman, Johns Hopkins University; Tomasz Mrowka, Massachusetts Institute of Technology; Richard Taylor, Institute for Advanced Study; and Moshe Vardi, Rice University. Elected as foreign associates were Manindra Agrawal, Indian Institute of Technology; Maxim Kontsevich, Institut des Hautes Études Scientifiques; and Kurt Mehlhorn, Max Planck Institute for Informatics.

—From an NAS announcement

AAAS Elections

The American Academy of Arts and Sciences (AAAS) has elected 197 new fellows and 16 foreign honorary members for 2015. Following are the names and institutions of the new fellows in mathematics, applied mathematics and statistics: László Babai, University of Chicago; Gérard Ben Arous, New York University; Björn Engquist, University of Texas at Austin; Igor B. Frenkel, Yale University; William P. Minicozzi II, Massachusetts Institute of Technology; Jill Pipher, Brown University; and Roger M. Temam, Indiana University. David R. Morrison, University of California Santa Barbara, was elected in the category of Intersection Candidates. Also honored are three researchers in computer science whose work involves considerable mathematics: Sanjeev Arora, Princeton University; Joseph Y. Halpern, Cornell University; and Ravindran Kannan, Microsoft Research Labs, Bangalore, India.

—From an AAAS announcement

Joseph Lehner, 1912–2013

Joseph Lehner was born in New York City on October 29, 1912, to Louis and Rachel (Rosenblum) Lehner and died in Haverford, Pennsylvania, on August 5, 2013. Lehner's scientific work was primarily concerned with automorphic forms for discontinuous groups and related number theory. He also was well known for his earlier research on diffusion cascades and neutron transport for the Manhattan Project and at the Los Alamos Laboratories.

In 1964, Lehner published one of the first treatises in English on automorphic forms [2], which included both the historical beginnings of the subject, as well as later developments, due especially to E. Hecke, H. Petersson, H. Rademacher, and C. L. Siegel. This book has become a classic and has served as an introductory book to automorphic forms for many generations.

Lehner's seminal joint paper with Oliver Atkin [1] introduced a method to study the arithmetic of modular

forms which fundamentally changed the field. The idea was to collect together forms for congruence subgroups $\Gamma_0(m)$ for all $m \geq 1$. For forms of $\Gamma_0(m)$, they distinguished "oldforms," which arise naturally from cusp forms of $\Gamma_0(n)$ with n dividing m, and "newforms," which are forms that genuinely live in $\Gamma_0(m)$. They pioneered the "theory of newforms," which reduces the study of the arithmetic of modular forms for $\Gamma_0(m)$ to that of newforms, and they studied the arithmetic of newforms in detail. The Atkin-Lehner theory of newforms was extended by T. Miyake [4] to forms for congruence subgroups $\Gamma_1(n)$ and completed by Li [3] for forms for all congruence subgroups of $SL_2\mathbf{Z}$. The newform theory naturally led to automorphic forms and automorphic representations for GL_2 in the adelic setting, and it therefore has had a far-reaching impact in the theory of automorphic forms. To date, researchers have been extending their ideas to study newforms for orthogonal groups. The Atkin-Lehner operators introduced in their paper [1] also play a fundamental role in the study of elliptic and Shimura modular forms.

Lehner earned his BS at New York University (1938) and his MA (1939) and PhD (1941) at the University of Pennsylvania under the supervision of Hans Rademacher. He began his academic career as an instructor at Cornell in 1941 but left in 1943 to join Kellex Corporation. Three years later, he became head of the mathematics group at Hydrocarbon Research Inc. Lehner returned briefly to academia as an associate professor at the University of Pennsylvania from 1949 to 1952 before joining Los Alamos Scientific Laboratory for five years. In 1957 he returned to academic pursuits to become professor at Michigan State University for six years, followed by nine years at the University of Maryland. His last position was as Mellon Professor at the University of Pittsburgh from 1972 to 1980.

Lehner published two books and sixty-seven research papers, with five arising from his work in defense. He had eleven coauthors, with Marvin Knopp and Morris Newman being his most frequent collaborators.

Lehner's education was delayed by the Great Depression. He worked for Macy's for seven years and for the WPA before beginning college courses at the University of Pennsylvania, where he met his future wife, Mary Beluch. They had one daughter, Zheindl, née Janet to whom we are grateful for providing much of the information in this remembrance.

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—*Bruce C. Berndt, Wen-Ching Winnie Li, and J. R. Smart*

In Memoriam

John Forbes Nash

1928–2015

Distinguished Mathematician, Abel Prize Laureate, Author, and Friend

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