Mathematics People

Solomon Feferman

Richard P. Stanley

Feferman and Stanley Receive Schock Prizes

Four Rolf Schock Prizes for 2003 have been awarded, two of them to mathematicians: SOLOMON FEFERMAN and RICHARD P. STANLEY.

The versatile philosopher and artist Rolf Schock (1933–1986) describes in his will a prize to be awarded in such widely differing subjects as logic and philosophy, mathematics, the visual arts, and music. The Royal Swedish Academy of Sciences, the Royal Swedish Academy of Fine Arts, and the Royal Swedish Academy of Music have awarded these prizes every other year since 1993. Each prize carries a monetary award of SEK 400,000 (about US$51,400).

Solomon Feferman

The Schock Prize in Logic and Philosophy was awarded to Solomon Feferman of Stanford University "for his works on the arithmetization of metamathematics, transfinite progressions of theories, and predicativity."

Solomon Feferman has made important contributions to all the main areas of logic. The works that motivate this year's Rolf Schock Prize concern arithmetization, transfinite progressions of theories, and predicativity. Arithmetization is a method of coding statements about a theory as formulas in the theory itself. It was introduced by the Austrian logician Kurt Gödel in the proof of his celebrated incompleteness theorems: any consistent and sufficiently expressive axiomatic theory is incomplete in the sense that it cannot prove all true statements expressed in its own language, and in particular not (the arithmetized version of) the statement that the theory itself is consistent, i.e., free from contradictions. Arithmetization is now a standard technique in logic, and it was Feferman who first systematically studied its scope and limitations, which

among other things led him to an important sharpening of Gödel's second theorem.

In a transfinite progression based on some theory one attempts to diminish its incompleteness by successively adding infinitely many true but unprovable statements as new axioms. In the late 1950s Feferman proved fundamental results about such progressions, using the arithmetization technique. This work also led to a study of predicativity. A predicative theory disallows definitions that are in a certain sense circular. Such theories can be approached via progressions, and in the early 1960s Feferman solved the problem of how far into the transfinite the predicative part of the theory of mathematical analysis reaches. In later works he has also made important contributions to our understanding of the concept of predicativity.

Solomon Feferman was born in New York in 1928. He obtained his Ph.D. in mathematics at the University of California, Berkeley, in 1957. Since then he has taught at Stanford University, from 1968 as professor of mathematics and philosophy. In 1993 he also became Patrick Suppes Family Professor in the School of Humanities and Sciences at the same university. Since 1990 he has been a fellow of the American Academy of Arts and Sciences. Feferman is the editor-in-chief of Kurt Gödel's *Collected Works*, volumes I–V.

Richard P. Stanley

The Schock Prize in Mathematics was awarded to Richard P. Stanley of the Massachusetts Institute of Technology "for his fundamental contributions to combinatorics and its relationship to algebra and geometry, in particular for his important contributions to the theory of convex polytopes and his innovative work on enumerative combinatorics."

Richard P. Stanley has made many pioneering contributions to combinatorics. In addition, he has forcefully and with great originality contributed to the discovery of new connections between combinatorics and other areas of mathematics, to great mutual benefit.

Among his most significant results are his contributions to the study of convex polytopes, the bodies that in higher dimensions correspond to three-dimensional polyhedra (such as cubes and pyramids), especially his proof of necessity in the characterization of f-vectors of simplicial polytopes via algebraic geometry (toric varieties). Furthermore, he has produced first-rate work prompted by enumerative problems, which he often solves in unexpected ways using techniques primarily from commutative algebra, algebraic and convex geometry, and representation theory. His ideas have not only influenced and altered combinatorics profoundly and permanently; they

have also stimulated research in the other areas mentioned.

Stanley's scientific production is marked by clarity, breadth, substance, and originality. The methods he has introduced are innovative and have led to decisive progress in many areas of mathematics. He has also spent much effort in writing graduate-level textbooks that have rapidly set the norm.

Richard P. Stanley was born in New York in 1944. He studied at the California Institute of Technology and Harvard University, where he received his doctorate in 1971. Since 1979 he has been professor of applied mathematics at MIT. He has been a visiting professor at a number of universities in the United States and France, and also at Stockholm University and the Royal Institute of Technology in Stockholm.

Mathematicians who have previously received the Schock Prize are: Elliott H. Lieb (2001), Yuri Manin (1999), Dana S. Scott (1997), Mikio Sato (1997), Andrew Wiles (1995), and Elias M. Stein (1993).

—From Royal Swedish Academy news releases

Hobson Wins Adams Prize

The University of Cambridge has announced the winner of one of its most prestigious prizes. The Adams Prize is awarded each year by the Faculty of Mathematics and St. John's College to a young researcher based in the United Kingdom who is doing first-class international research in the mathematical sciences.

The winner for 2003 in the area of financial mathematics is DAVID HOBSON of Bath University for contributions over a wide range of major current topics in the field that have "important implications for the stock market," according to the prize citation.

Hobson's research includes the use of coupling methods to establish price inequalities for complex pricing models, deep results on robust hedging, pricing and hedging of passport options, and pricing of real options. He has also achieved results in theoretical probability, martingale inequalities, and Skorokhod embedding.

The Adams Prize is named after the mathematician John Couch Adams and was endowed by members of St. John's College. It is currently worth £15,000 (approximately US$24,000), 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 University of Cambridge announcement

Prizes of the Mathematical Society of Japan

The Mathematical Society of Japan (MSJ) has awarded its 2003 Spring Prize to TOMOTADA OHTSUKI of Tokyo University and the Algebra Prize to KEI-ICHI WATANABE of Nihon University.

The Spring Prize is awarded each year to a mathematician who is not older than forty and who has made an outstanding contribution to mathematics. Ohtsuki was honored for contributions to the study of quantum invariants for 3-manifolds.

The Algebra Prize is awarded every year to a maximum of two algebraists in recognition of outstanding contributions in algebra. Watanabe was honored for his outstanding contributions to commutative ring theory and its applications to singularity theory.

—From an MSJ announcement

Leibniz Prizes Awarded

The Deutscheforschungsgemeinschaft, the main scientific research funding agency of the German government, has awarded the 2003 Leibniz Prizes to eleven researchers. Five of the prizewinners work in the mathematical sciences. Each prize provides a research grant of 1.55 million euros (approximately US$1.7 million) over five years.

HÉLÈNE ESNAULT and ECKHART VIEHWEG are the first married couple to receive a Leibniz Prize for joint work. They have been collaborating for more than twenty years and during this time have coauthored approximately twenty-five substantial publications. Their work is in the area of algebraic and arithmetic geometry. Esnault received her Ph.D. from the Université de Paris VII in 1984. Viehweg received his Ph.D. at the Universität Mannheim in 1975. Both are currently professors at the Universität Essen.

GERHARD HUISKEN works at the crossroads of pure mathematics and theoretical physics. His mathematical research is in analysis and differential geometry, and his physics research is in general relativity. He received his Ph.D. from the Universität Heidelberg in 1983 and is currently the director of the Albert Einstein Institute for Gravitational Physics, a Max Planck Society institute in Golm, a suburb of Potsdam.

RUPERT KLEIN is a leading expert in theoretical fluid mechanics whose research is highly regarded in engineering as well as in applied and numerical mathematics. Some of his most important work has centered on models for tropical meteorology. He studied mechanical engineering at the RWTH (Rheinisch-Westfälische Technische Hochschule) Aachen, receiving his Ph.D. in 1988. He currently holds a joint appointment at the Freie Universität Berlin and at the Potsdam Institute for Climatology.

HANS-PETER SEIDEL works in modeling, graphics, and visualization. He has developed algorithms as part of a wholistic approach to problems that extends from data acquisition to modeling to graphical synthesis. He received his Ph.D. in mathematics in 1987 at the Universität

Tübingen. Since 1999 he has been the director of the Max Planck Institute for Computer Science in Saarbrücken and an honorary professor at the Universität des Saarlandes in Saarbrücken.

—Allyn Jackson

National Academy of Sciences Elections

The National Academy of Sciences has announced the election of seventy-two new members and eighteen foreign associates. The following mathematical scientists are among the newly elected members: GEORGE E. ANDREWS, Pennsylvania State University; JAMES O. BERGER, Duke University; YAKOV ELIASHBERG, Stanford University; G. DAVID FORNEY JR., Massachusetts Institute of Technology; and SOLOMON W. GOLOMB, University of Southern California. HAIM BREZIS, Université Pierre et Marie Curie, Paris, France, was elected as a foreign member.

—From an NAS announcement

American Academy of Arts and Sciences Elections

Ten mathematical scientists have been elected to membership in the American Academy of Arts and Sciences for 2003. They are: THOMAS COVER, Stanford University; PERCY A. DEIFT, Courant Institute, New York University; LAWRENCE C. EVANS, University of California, Berkeley; SOLOMON W. GOLOMB, University of Southern California; RICHARD HAMILTON, Columbia University; IAIN JOHNSTONE, Stanford University; WILLIAM M. KAHAN, University of California, Berkeley; NICHOLAS M. KATZ, Princeton University; and WILFRIED SCHMID, Harvard University. JAMES G. ARTHUR of the University of Toronto was elected a foreign honorary member for 2002.

The American Academy of Arts and Sciences was founded in 1780 to foster the development of knowledge as a means of promoting the public interest and social progress. The membership of the academy is elected and represents distinction and achievement in a range of intellectual disciplines—mathematical and physical sciences, biological sciences, social arts and sciences, and humanities and fine arts.

—From an American Academy announcement

Putnam Prizes Awarded

The winners of the 63rd William Lowell Putnam Competition have been announced. The Putnam Competition is administered by the Mathematical Association of America and consists of an examination containing mathematical problems that are designed to test both originality and technical competence. Prizes are awarded to both individuals and teams.

The five highest ranking individuals, listed in alphabetical order, were: REID W. BARTON, Massachusetts Institute of Technology; GABRIEL D. CARROLL, Harvard University; DENISS CEBIKINS, Massachusetts Institute of Technology; ALEXANDER B. SCHWARTZ, Harvard University; and MELANIE E. WOOD, Duke University.

Institutions with at least three registered participants obtain a team ranking in the competition based on the rankings of three designated individual participants. The five top-ranked teams (with team members listed in alphabetical order) were: Harvard University (Gabriel D. Carroll, George Lee Jr., Alexander B. Schwartz); Princeton University (Stefan L. Hornet, Mihai Manea, Radu H. Mihaescu); Duke University (David G. Arthur, Oaz Nir, Melanie E. Wood); University of California, Berkeley (Boris Bukh, James M. Merryfield, Austin W. Shapiro); and Stanford University (Chee Hau Tan, Paul A. Valiant, Daniel Wright).

The top five individuals in the competition received cash awards of $2,500; the next ten received $1,000. The first-place team was awarded $25,000, with each team member receiving $1,000. The team awards for second place were $20,000 and $800; for third place, $15,000 and $600; for fourth place, $10,000 and $400; and for fifth place, $5,000 and $200.

The Elizabeth Lowell Putnam Prize is awarded periodically to a woman whose participation in the Putnam Competition is deemed particularly meritorious. In the recent competition, this prize went to MELANIE E. WOOD of Duke University. The prize carries a cash award of $1,000. Wood also received this prize in last year's competition.

—Elaine Kehoe

USA Mathematical Olympiad

The thirty-second annual USA Mathematical Olympiad (USAMO) was held April 29 and 30, 2003. The students participating in the Olympiad were selected on the basis of their performances on the American High School and American Invitational Mathematics Examinations, which involved hundreds of thousands of students.

The twelve highest scorers in the USAMO, listed in alphabetical order, were: BORIS ALEXEEV of Athens, Georgia; JAE BAE of Hackensack, New Jersey; DANIEL KANE of Madison, Wisconsin; ANDERS KASEORG of Charlotte, North Carolina; MARK LIPSON of Lexington, Massachusetts; TIANKAI LIU of Exeter, New Hampshire; PO LING LOH of Madison, Wisconsin; PO RU LOH of Madison, Wisconsin; AARON PIXTON of Vestal, New York; KWOKFUNG TANG of Exeter, New Hampshire; TONY ZHANG of Exeter, New Hampshire; and YAN ZHANG of Alexandria, Virginia. Tiankai Liu and Po Ru Loh received perfect scores.

The twelve USAMO winners will attend the Mathematical Olympiad Summer Program (MOSP), after which six of the twelve students will be selected as the United States team to compete in the International Mathematical Olympiad (IMO) to be held in Tokyo, Japan, July 7–19, 2003.

—Elaine Kehoe